PSF – PWA – 1935, 1936, 1938, 1940

Box 176

Subject File
Box 176

PSF: PWA

Handed to night Wire.

MEMORANDUM RE PWA PROGRAM

File personal

I

PWA Applications

(a) Applications available. PWA has approximately 6,000 applications calling for an expenditure of approximately $1,500,000,000. This entire $1,500,000,000 expenditure can be financed at an ultimate cost to the Federal Government of only $675,000,000 because $825,000,000 (55% of the cost of these projects) will be furnished by legally enforceable loans obtained in most cases in the present condition of the private municipal bond market from that market and not from Government lending. These 6,000 applications have already been examined from an engineering, legal and financial standpoint and in the event funds are immediately made available the actual work can be put under way not later than January 1, 1936, except where weather conditions prevent.

(b) Applications submitted to WPA. Of the 6,000 applications above referred to approximately 3,570 fully examined applications, totaling more than $906,000,000, have already been submitted by PWA to WPA. Of these 3,570 WPA has approved only 782 (one-fifth of the number offered) involving an expenditure of approximately $136,000,000 (one-seventh of the amount offered). WPA has already rejected, therefore, approximately 2,800 PWA applications for waterworks, schools, sewers, sewage disposal plants, hospitals, public buildings, power plants and other really useful projects against which no charges of wasteful Governmental expenditure can be made. During the last ten days WPA has considered approximately 1,100 PWA applications - approved 150 and rejected 950.

The action taken on the Ohio PWA program to date (contained on the attached list) is typical. More than 235 PWA Ohio applications for projects involving a total cost of $67,000,000, of which the Federal Government would have to bear less than $30,000,000, have been submitted to the WPA. Only 21 of these 235 projects, involving a total expenditure of less than $2,500,000, had been approved to date by WPA. The average man cost on these PWA Ohio projects is only $1,140. At the same time that WPA was turning down these desirable PWA Ohio projects, WPA approved $4,500,000 of its own projects of a CWA variety which on the whole, according to the admission of WPA's own executives, were poor projects from the point of view of permanent social value.

(c) PWA Applications yet to be Offered to WPA. Approximately 700 applications (additional to the 3,570 already submitted) totaling more than $378,000,000 are now pending before WPA. Still another 1,700 are in process of examination and submission to the WPA. It is anticipated that all 6,000 of the applications which have been submitted to PWA will be presented to WPA not later than Wednesday of next week.

II.

Man-year Cost for PWA Projects

Man-year cost for projects is figured by PWA on a basis of 1,175 man-hours per year. This is an empiric not a theoretical figure. It is the actual average of man hours on more than 4,000 non Federal PWA projects over the last two years and PWA pays the prevailing wage only for hours actually worked. The Works Progress Administration computes man-year cost per project on the basis of 1,500 man-hours per year because WPA pays a subsistence wage based on a fixed monthly rate without regard to the actual number of working hours. The differential between the 1,175 hour standard used by PWA and the 1,500 hour employed by the Works Progress Administration for computing the cost to the Federal Government of taking a man from the relief rolls and putting him on the work rolls is approximately 25%. But WPA, reviewing PWA projects, always refigures PWA projects on WPA's own 1,500 hour basis. The result is that a man-year cost of $1,000 on a PWA project is refigured by the WPA as $1,250. Most of the refusal of PWA applications for high cost has been based on this refiguring.

III.

Speed on PWA Projects

Actual work may now be started on virtually all PWA projects within three months after their approval.

Earlier delays in PWA were largely due to deficiency of statutory powers of the borrowing bodies. These deficiencies have been corrected through legislation already enacted at the recent sessions of the several legislatures at the President's request.

Under the old program the examination of applications was carried on from the Washington office. Under the new program the PWA central staff - trained over nearly three years - has been decentralized already, in order to permit completion of the work of examination on the ground. Each state office has been manned with capable lawyers, engineers and finance men with more than two years familiarity with current municipal problems in that state. This decentralization overcomes many of the long delays and misunderstandings caused by the unfamiliarity of applicants with the requirements of the central office. Within 24 hours after notification of an allotment is received from the Comptroller General, PWA is now able to send the applicant its contract. Under the new program PWA has received advice of allotments from Mr. McCarl on 263 applications and contracts have already been submitted to the applicants for virtually all of these projects. Under the old program it took upwards of a month to two months from the time the allotment was made to prepare the contract.

IV.

Correlation of WPA and PWA Projects

In passing upon PWA projects from the point of view of relief labor available, WPA approves PWA projects only when the available labor can not be absorbed by WPA's relief projects. Consequently, whenever WPA projects are available in a locality PWA projects are deferred. The attached news clipping indicates that those in charge of WPA intend to displace PWA projects completely so long as WPA projects can be devised, and to carry out the national works program "almost entirely on an elaborated CWA basis".

Preference for WPA projects may be justified for the first three or four months of the program because the lighter projects requiring less elaborate plans and specifications ought to be capable of quicker execution. But it would seem that PWA projects (more permanently valuable, more publicly acceptable, and more stimulating to the private capital goods industries) should be given a preference for work to be done after January 1st and that WPA projects should thereafter be used only to make up the deficiency in PWA projects in any particular locality.

Such preference would seem justified not only because of the more permanent value of the PWA projects but because of the substantial contribution made toward them by the local communities and the preference of those communities for construction of permanent value. WPA projects contemplate contributions by the local communities. But those communities clearly tend to regard their contributions to the WPA projects as a matter for continuous renegotiable "adjustment" rather than as a firm obligation settled once and for all under PWA procedure by the issuance of bonds or the deposit of cash to secure the fulfillment of the obligations of the communities.

September 7, 1935

P.W.P. 79

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS

Status of P. W. A. State Applications Dockets and Allotments DAILY REPORT

To: Progress Control Division
From: Projects Division

Date 9/5/35 (Close of Business)

Status of Applications State Offices	Number of Applications Previous	Today	Total	Amount (Dollars)
1. Total applications received State Office	4852	0	4852	$950,445,935
2. Applications disapproved State Office	8	0	8	5,813,430
3. Net applications in State Office (1 - 2)	4844	0	4844	944,632,505
4. Forwarded Wash. Office (N.E.C. form only)	2382	594	2976	491,735,337
5. Forwarded Wash. Office (complete)	1381	46	1427	204,144,969
6. Total forwarded Wash. Office (4 plus 5)	3763	640	4403	695,880,306
7. Pending action State Office (3 - 6)	1081		441	248,752,199
Status Dockets Washington Office				
8. Application rec'd Wash. Office (6 above)	3763	640	4403	695,880,306
9. New application sent D.A.I.	2894	182	3076	584,755,011
10. Old dockets sent D.A.I.	477	15	492	322,075,305
11. Total sent D.A.I. (9 plus 10)	3371	197	3568	906,830,316
12. New applications pending action Wash. (8-9)	869	458	1327	111,125,295
Status N.E.C. Applications at D.A.I.				
13. Total applications sent D.A.I. (11 above)	3371	197	3568	906,830,316
14. Applications withdrawn from D.A.I.	84	1	85	50,158,037
15. Total less withdrawals sent D.A.I. (13-14)	3287	196	3483	856,672,279
16. Total approved by D.A.I.	782	0	782	136,041,661
17. Total disapproved by D.A.I.	2032	0	2032	341,813,626
18. Total pending action D.A.I. (15 -(16 plus 17)	473		669	378,816,992
Status N.E.C. Applications at A.C.A.				
19. Total presented A.C.A. (16 above)	782	0	782	136,041,661
20. Total approved by A.C.A.	625	0	625	127,213,422
21. Total disapproved by A.C.A.	0	0	0	
22. Total pending action A.C.A. (19 -(20 plus 21)	157	0	157	8,828,239
23. Total allotted funds by A.C.A. (20 above)	625	0	625	127,213,422
Loans by P.W.A. Supplementing #23	342	0	342	76,664,100
24. Allotments held in abeyance	1	0	1	730,000
25. Rescissions by A.C.A.	1	0	1	475,363
26. Outstanding Allotments (23 - 25)	624	0	624	126,738,059
Status A.C.A. Allotments				
27. Allotments approved by the President	341	0	341	70,688,082
E. R. Act 1935				
28. Notice of allocation rec'd from Treasury	263	0	263	x53,235,335 0

*Eliminations are made when applications are received.

xIncludes a loan for $10,500,000 (Colo. River)

P.W.P. 79

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS

Status of P. W. A. State Applications
Dockets and Allotments
DAILY REPORT

Date 9/5/35
(Close of Business)

To: Progress Control Division
From: Projects Division

RECEIVED
SEP 5 1935
E. H. FOLEY, JR.

Status of Applications State Offices	Number of Applications Previous	Today	Total	Amount (Dollars)
1. Total applications received State Office	4852	0	4852	$950,445,935
2. Applications disapproved State Office	8	0	8	5,813,430
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E. R. Act 1935 28. Notice of allocation rec'd from Treasury	263	0	263	x53,235,335

xIncludes a loan for $10,500,000 (Colo. River)

Eliminations are same state applications received.

#1

PSF
(PWA)

FRANKLIN D. ROOSEVELT
HYDE PARK, DUTCHESS COUNTY
NEW YORK

To be put back.

Agric. Anim. Industry	(1,454,000)	- 250,000.
Int. Com. - Plant Quar.	(14,789,817)	2,789,817.
Forest Service.	(13,827,500)	2,827,500.
Pub. Roads	(391,000,000)	60,000,000.
Dept. Alaska		71,500.
Reclamation		9,850,000.
Navy Y. & Docks		1,086,470.
Treas. Coast Guard		263,995
Public Health		450,000
~~Miscellaneous~~		
War Dept. Corps.		1,192,916
C. C. C.		25,000,000.
Housing.		123,182,000.
		226,964,192
Out of this must come R.E. Inc.		75,000,000
and loans for P.W.A. Grants		151,964,192

#2

FRANKLIN D. ROOSEVELT
HYDE PARK, DUTCHESS COUNTY
NEW YORK

Deadline for Grants,
~~Deadline for Loans~~.

1 - Applicant must demonstrate ability to finance at once
2 - To put the people to work by Dec 15. & end by 1 year
3 - Utility & desirability

W.P.A. certifies only as to unemployed available

Thereafter loans in the mopping up process to be made without interest - only a few meritorious cases.

Dont make public the amount available for grants.

(over)

#3
PSF (PWA)
Bx 176

Allotted 3,150,000,000
Bal. 850,000,000

Give P.W.A. for grants 50,000,000.
Out of old fund for loans 150,000,000

Sept 1 - left 1,600,000,000
Passed by Allot Bd 300

Left 1,300,000,000
Got back from various allotments already made 300,000,000

Available 1,600,000,000.
Fed. Emergen. Admin Old[illegible] [illegible] 128,000,000

272,000

400,000,000

Net Free 1,200,000,000

Smith's speech Carnegie 1919 about Hearst. & again in 26 about milk

PSF : PWA

ADDRESS ALL COMMUNICATIONS TO
THE CHIEF ENGINEER

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CUSTOMHOUSE
DENVER, COLORADO

Commissioner

Engineering

OFFICE OF THE CHIEF ENGINEER

May 8, 1936.

To the Secretary of the Interior,

Washington, D. C.

(Through the Acting Commissioner)

Sir:

There are forwarded, herewith, two copies of the report of the Board appointed by you to review cost estimates on the Passamaquoddy Tidal Power Development Project.

The originals of the plates and one copy of the report are held on file in the office of the Bureau of Reclamation, Denver, Colorado, and we understand that this office will hold itself ready to supply further copies in such number as may be desired.

Trusting that this report may meet the purposes for which the Board was appointed, we beg to remain

Very respectfully yours,

The Board, by W. F. Durand
W. F. Durand, Chairman.

ADDRESS ALL COMMUNICATIONS TO
THE COMMISSIONER

PF
PWA

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
WASHINGTON

OFFICE OF THE COMMISSIONER

May 14, 1936.

Memorandum for the Secretary:

I am transmitting herewith two copies of the report and the original letter of transmittal from the board of consulting engineers appointed by you to make a review of the cost of the Passamaquoddy project.

The original data for this report is available in the Chief Engineer's office, and additional copies can be prepared and furnished if you desire.

John C. Page
Acting Commissioner.

Enclosure 802183.

PSF PWA

FEDERAL EMERGENCY ADMINISTRATOR
OF PUBLIC WORKS
WASHINGTON

May 18, 1936.

File
5-19-36
Graham
Asst Admin.

Memorandum for Mrs. Graham:

Can you give me a brief, quick digest of this for the President.

H.L.I.
Administrator.

Enc.) Report from board of consulting engineers re cost of the Passamaquoddy project.

FOR THE SECRETARY OF THE INTERIOR

FEDERAL EMERGENCY ADMINISTRATION
OF PUBLIC WORKS

PWA
PST - Passamaquoddy
Project 2-3 A

WASHINGTON, D.C.

May 19, 1936.

Confidential Memorandum for the Administrator.

Re: Summary of Report from the Board of Engineers regarding the cost of the Passamaquoddy project.

1. Scope of the inquiry made by the Board of Engineers.

On February 13, 1936 a Board of Engineers consisting of Dr. W. F. Durand, Messrs. Charles H. Paul and Joseph Jacobs, under the general jurisdiction of the Bureau of Reclamation, was appointed by the Acting Secretary of the Interior. The Engineers were instructed to review certain specific cost estimates for the Passamaquoddy project identified as the Cooper estimate, involving $50,125,000, and the United States Engineers estimate, involving $61,500,000. After examining both estimates and other data available, the Board was to submit its own estimate of cost.

In submitting its final report herewith attached, the Board calls attention to the fact that it has adhered strictly to the designated lines of inquiry and nothing in its report is intended to refer to any aspect of the project other than cost.

2. Findings of the Board of Engineers.

In its preliminary report dated March 30, 1936, the Board of Engineers stated that although the detailed structures upon which the Cooper and the United States Engineers estimates are based differ somewhat in location and character, both designs represent essentially the same engineering project. The disparity between the two sets of costs is accounted for partly by the fact that the United States Engineers estimate was based on the results of exploratory work made subsequent to the preparation of the Cooper estimate and hence not available for the latter. Moreover, additional exploration and study since the preparation of the United States Engineers estimate has resulted in further proposed modifications of structure and locations as compared with those furnishing the bases of the earlier estimate. The present estimate prepared by the Board and based on the latest studies involves a still higher cost of $71,700,000.

The following factors contribute to the higher cost set up by the Board of Engineers:

(a) A progressive development of designs for the project as a whole resulting from continuing engineering exploratory studies;

(b) No item for interest during construction was included in either the Cooper or the United States Engineers estimate;

(c) Difference in the estimates of quantities of materials required;

(d) Difference in estimated unit prices reflecting present price levels;

(e) Difference in judgment as to relative importance of certain necessary items of cost coming under the general heads of contingency, engineering and overhead;

(f) Need for further exploratory work.

3. Major alternative Engineering plans not considered by the Board of Engineers.

In connection with the Board's consideration of the pump storage feature of Haycock Reservoir, the following statement is significant: "We are informed that other reservoir locations are under investigation, and also that the substitution of a Diesel power plant for this feature is being given consideration. Inasmuch, however, as the discussion of these alternates lies outside the line of our instructions, we make no further comment on this subject." The implication is that if the Board had been given wider latitude in its inquiry, it might have recommended a project quite different from that contemplated either by the Cooper estimate or by the United States Engineers estimate.

Leona B Graham

Leona B. Graham,
Executive Assistant.

Attachment.

PASSAMAQUODDY TIDAL POWER PROJECT

REPORT OF BOARD OF ENGINEERS
ON COST ESTIMATES OF
PROJECT

MAY, 1936.

PSF
PWA

PASSAMAQUODDY TIDAL POWER PROJECT

✣

REPORT OF BOARD OF ENGINEERS ON COST ESTIMATES OF PROJECT

✣

MAY, 1936.

✣

PSF - PWA

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SUMMARY OF REPORT

This report is based on a review of the "Cooper Estimate" of January 1935, and the "U. S. Engineers Estimate" of December 1935.

The detailed structures upon which these two estimates are based differ somewhat in location and character. Both designs, however, represent essentially the same engineering project.

The U. S. Engineers estimate was based upon the results of exploratory work made subsequent to the preparation of the Cooper estimate, and hence not available for the latter, and this work of exploration and study has been continued by the U. S. Engineers, resulting in further proposed modifications of structures and locations as compared with those furnishing the basis of the earlier estimate.

The estimate prepared by this Board, without departing from the general project plan contemplated in the two estimates mentioned above, is based on these more recent locations and characteristics of the various structures, representing these later studies by the U. S. Engineers.

In the preparation of the present estimate the judgment of the Board has, in general, been restricted to consideration of the best available structure plans including the forms of sections for the several dams, to quantities of engineering materials required, to unit prices, and to a consideration of suitable provisions for engineering and contingency, general overhead and interest during construction.

The results of this estimate in summary form are as follows:

Summary of Cost Estimate

(See Appendix E)

Total of Feature Costs	$64,300,000
General Overhead (6%)	3,858,000
Sub-total	$68,158,000
Interest during construction	3,578,000
Total estimated cost, say	$71,700,000

Note: - No item for interest during construction was included in either the Cooper or the U. S. Engineers estimate. Therefore, the above sub-total of $68,158,000 is the figure comparable with the grand totals of those estimates.

Denver, Colorado,

May 8, 1936.

Honorable Harold L. Ickes,
Secretary of the Interior,
Washington, D. C.

Dear Sir:

The Special Board, appointed by you to review certain cost estimates on the Passamaquoddy Tidal Power Project, submits herewith its report including appendices covering estimates of cost in summary and in detail, with explanatory notes and discussion of special features of the project.

In carrying out this work we spent first one week in Washington, D. C., during which we contacted the Chief of Engineers, U. S. Army and officers of his staff, and made ourselves familiar with the general features of the project. At two different times we spent a week each at Eastport, Maine, during which time we contacted the District Engineer, Colonel P. D. Fleming, and the officers and civilian members of his staff and also Mr. Dexter P. Cooper and his office engineer. During these periods we were able to familiarize ourselves generally with the principal features of the project by personal inspection on the ground. We also spent three days at Worcester, Massachusetts, for the purpose of witnessing, at the Alden Hydraulic Laboratory, the results of certain important tests bearing upon the design of the Navigation Lock and of the Eastport, Lubec and Dudley Island Dams, and in the discussion together of unit prices and other details of our work.

From these various sources we have received information, both documentary and in verbal form, regarding the bases of design for the various structures and features of the project, as well as the ground work and structure of the estimates of cost.

At the start of our work we were furnished, on our request, with the services of an engineer from the office of the Bureau of Reclamation in Denver, Colorado, expert in matters of design, construction and cost estimates, to serve as technical assistant in carrying forward the details of our work. This assistant, Mr. R. S. Lieurance, was continuously engaged at Eastport over a period of about five weeks in the collection of information relating to the project, drawings, design data, etc., and in its organization into form most directly available for our use.

The later stages of our work we have carried out at Denver, aided further in matters of detail by Mr. Lieurance and other members of the engineering staff of the Bureau of Reclamation, kindly placed at our disposal by its chief engineer.

(1) General Conditions Governing the Preparation of Estimate

We quote as follows the essential paragraphs of our letter of instructions:

> "You have been designated to review certain specific cost estimates for the Passamaquoddy project.
>
> "One of these estimates is found in the report submitted by the Passamaquoddy Bay Tidal Project Commission, under date of January 17, 1935, and totals $30,125,000. Another, for substantially the same project prepared in December 1935 by the Corps of Engineers, U. S. Army, totals $61,500,000.

> "In view of the great disparity between these amounts you are instructed to examine both estimates in detail, together with such pertinent field and office data as may be available, and to submit your own estimate of cost of the same project on which the above estimates were based."

In carrying out these instructions we call attention to the fact that we have adhered strictly to the review of the two specific estimates therein identified, and to the making of a revised estimate based on and covering the same general project to which these estimates relate.

Nothing in the present report is intended to refer to any aspects of this project other than cost.

In advance of any discussion of the details of the estimates, we consider it desirable to point out that the features and engineering structures covered by these two estimates of cost are not in all respects the same, although they are intended to accomplish the same general purpose and represent essentially the same engineering project. The estimate made by the U. S. Engineers is, however, based on investigations made and data secured subsequent to the preparation of the estimate submitted by the Passamaquoddy Bay Tidal Project Commission (hereafter called the Cooper Estimate) and represents, therefore, a progressive development of the designs for the project as a whole.

These differences between the Cooper plans and those of the U. S. Engineers naturally account in part for the divergence between the two estimates. Other causes which account in larger degree for this divergence, are found in differences (sometimes by large percentages) in the estimates of quantities of materials required, in the estimated unit prices and in the omission or inadequate recognition, in the Cooper estimate, of certain necessary items of cost coming under the general heads of contingency, engineering and overhead.

Still further causes are found in the inclusion in the U. S. Engineers' estimate of sums for further exploratory work (which, in our opinion, is essential) and of prices and allowances intended to take cognizance of the special conditions under which this work is being carried on.

(2) Changes in the Plans since December 1935.

The estimate made by the U. S. Engineers, and identified in our letter of instructions, was based (as noted above) on a considerable amount of exploratory work and additional information developed thereby, not available for and not represented in the Cooper Estimate made at an earlier date. This work of exploration, survey, research, test, and the study of possible alternates of design and construction has gone on continuously since the preparation of the estimate of December 1935, and in the light of the information thus developed, further modifications have been made in the location and character of some of the structures involved in the project. Since these later modifications express the results of this more extended period of exploration and study, and since in development and form the U. S. Engineers' plans are more complete than those used as a basis for the Cooper estimate, we have in general adopted these more recent plans as the basis for our own estimate of cost.

(3) Basis of Present Estimates

In general, therefore, the present estimate is based on the locations and structures indicated by this later period of exploratory work and the studies based thereon. We have, however, in preparing our own estimate, made certain modifications in the cross sections of some of the

proposed dams, and have adopted certain percentage allowances for the subsidence of those structures, for wastage in placing of the material, and for meeting special local conditions, all in accordance with our best judgment in these matters.

With particular reference to unit prices, we consider those adopted by us to be fair contract bid prices under the conditions prevailing on this project. In fixing these prices, cognizance has been taken of the local climatic conditions, of employees liability insurance requirements in Maine, and of the conditions imposed by the Emergency Relief Appropriation Act, and of such other unusual conditions, as have application to special features of the work.

In our "Summary Estimate of Entire Project", the item (8) immediately preceding the "Grand Total", is for interest during construction. No item corresponding to this was included in either the Cooper estimate or in that of the U. S. Engineers. Therefore, in comparing our estimate with the above, our Item (7) should be taken as corresponding to the grand totals in those estimates.

(4) Increase in Estimates of U. S. Engineers since December 1935.

It seems proper to note that, in several features of the project as a result of the continuous studies referred to, the more recent estimates of the U. S. Engineers call for larger quantities of materials and in some cases higher unit prices than those used in their estimate of December 1935.

In other words, the U. S. Engineers' estimate of December 1935, aggregating $61,500,000, if now revised by them in accordance with this

more recent information, would, apparently, show an increase of perhaps considerable amount.

(5) Brief Discussion of the More Important Structures of the Project

The preceding paragraphs refer to the more general aspects of the project and of our estimate of its cost. It seems desirable to supplement these with some brief reference to the more important individual structures.

Navigation Lock. The lock as proposed in the Cooper plans has a length of 200 feet, width 45 feet and sill at elevation -25.5 feet. That proposed in the estimate by the U. S. Engineers has a length of 360 feet, width of 56 feet and sill at -25.5 feet. These differences in lock dimensions represent a considerable item in the estimates of cost.

Inasmuch as the larger lock seems more fully in accord with general navigation requirements in and out of Cobscook Bay, and is more nearly consistent with a general development of this magnitude, we have adopted these larger dimensions in the estimates herewith.

Filling Gates. The Cooper estimate contemplated for this feature of the project 25 gates of the submerged Venturi type, size 30 feet by 30 feet and located between Treat and Dudley Islands.

The U. S. Engineers' latest design contemplates 15 gates of the so-called open Venturi type, sixty feet in width each, and located in the south end of Treat Island.

The choice of the latter design was based on extended model experiments at the Alden Hydraulic Laboratory, Worcester, Massachusetts,

indicating the superiority of the "open" type. The location of this structure on Treat Island has certain advantages with regard to foundation conditions and the rock removed in the necessary excavations would be immediately available for the nearby Eastport, Dudley Island, and Lubec Dams.

We have, therefore, based the present estimate on the type of gate and location as represented by the most recent plans developed by the U. S. Engineers.

Eastport, Lubec and Dudley Island Dams. The form of section for these three dams, as shown in Plate II, differs from that in either of the estimates which are the subject of this review. This form of section (see Plate II) has been adopted by us for estimating purposes as a result of a careful consideration of the factors entering into the problem of the construction of a rock fill dam by dumping rock into moving water, and in particular, as indicated by the most recent results of experimental research on this problem, witnessed by us at the Alden Hydraulic Laboratory, Worcester, Massachusetts, on March 23, 1935.

The amount of subsidence of the rockfill section of the dams into the strata of clay overlying the bedrock, represents the largest element of uncertainty in the estimate of the quantity of rock required for these dams. Estimates have varied from 25% to nearly 100% of the net volume of the structure. The most recent program of construction for these dams contemplates the provision, immediately on top of the clay and before beginning the dumping of large rock, of a bed or blanket of granular material - relatively small rock, quarry waste, gravel or coarse sand - thus separating the larger rock from direct contact with the clay strata.

Experiments have also been made by the U. S. Engineers, to determine the bearing power of these clay strata by measurement of the settlement of a loaded spud or pipe closed at the lower end, making due allowance for frictional resistance on the outer surface of this pipe.

Taking into account the results of these measurements on the loaded spud, our own direct examination of several samples of these clay strata, and with due allowance for the anticipated stiffening effect of the fine rock, gravel and sand blanket in resisting local penetration, we have adopted for the estimate herewith, a subsidence of 60% of the net volume of the structure. This allowance, together with a further allowance of 10% for drift and wastage in placing the rock and the gravel-sand-clay blanket facing the Cobscook side, form the basis of our estimates of quantities required for these dams.

Carlow Island and Pleasant Point Dams. The sections used in our estimates for these dams remain the same as in the U. S. Engineers Estimate (see Plate III). The extra width of gravel cover on the Cobscook side results from the requirement of carrying both highway and railway along these structures. The dams are low, the construction is relatively easy and in our opinion (as expressed also in the estimate of the U. S. Engineers) the subsidence into the clay strata will be adequately provided for by a nominal allowance for wastage and settlement. The unit cost adopted in our estimate for the rock for these two dams is greater than for the three other dams, for the reason that the rock is being taken from a small quarry where development costs will be high and the quantities to be handled will be relatively small. These dams have been under construction for several months, and costs to date are available.

Power House Structure. We are informed that the present location for this structure, as adopted in the estimate of the U. S. Engineers, is the result of a study covering a very considerable number of locations in the general vicinity of Carrying Place Cove. The length of the structure is determined primarily by the number and spacing of the generator units to be installed. Both the Cooper estimate and that of the U. S. Engineers agree as to the number (10) but differ as to the spacing, 64 feet in the former and 80 feet in the latter. The closer spacing appears to have been chosen with the acceptance of a somewhat higher tailrace velocity and consequent greater loss of effective head, or otherwise in the hope that a higher turbine speed (53 r.p.m. instead of 40) might be found acceptable with a smaller machine, and hence relatively more space for tailrace flow. The most recent advices from the manufacturers of such equipment, however, indicate that the higher rotative speed would involve a relatively serious loss in efficiency and that, on all counts, the lower figure is the better compromise. We have, therefore, in our estimate, used the wider spacing.

A further difference of importance is found in the omission, in the Cooper estimate of any power house superstructure, the generator units themselves with a hooded top being left open to the weather. The U. S. Engineers' estimate, on the other hand, comprises a normal superstructure for housing the units, control room, etc.

Having in view the coastal location and the inclemency of the weather in winter, especially under storm conditions, we have favored the general type of design which provides the usual superstructure.

Dams in the Haycock Reservoir. It should be noted that the information at present available regarding the various dams contemplated for the formation of this pump storage reservoir is less adequate for estimating purposes than for most of the other features of the project. We have, however, made a personal inspection of a considerable part of the area to be covered by this reservoir with note of such special conditions as could be observed. In addition, we have availed ourselves of the results of the most recent geological study of this area as given in a report by the Consulting Geologist, Mr. I. B. Crosby, and have further profited by a number of personal conferences with him.

In the light of this information and in the exercise of our best judgment, we have used, for estimating the cost of these dams, the cross section shown with explanatory notes in Plate IV.

Regarding the general problem of this pump storage feature of the project, we are informed that other reservoir locations are under investigation, and also that the substitution of a Diesel power plant for this feature is being given consideration. Inasmuch, however, as the discussion of these alternates lies outside the line of our instructions, we make no further comment on this subject.

In closing our report, we desire to express our grateful acknowledgments for the generous and wholehearted cooperation which we have

received from Mr. Dexter P. Cooper and his office engineer, from the Chief of Engineers, U. S. Army, and officers of his staff in Washington, from the District Engineer at Eastport and members of his staff, and finally to the office of the Bureau of Reclamation at Denver, for the valuable aid in matters of detail which has been furnished, and without which any report of estimate, in the period since our appointment, would have been impracticable.

Respectfully submitted,

W. F. Durand, Chairman

Joseph Jacobs

Joseph Jacobs

Chas. H. Paul

Chas. H. Paul.

Appendices.

APPENDIX A

COST ESTIMATES

PRELIMINARY STATEMENT

Before proceeding with the detailed estimates, and to avoid repetition of statement throughout the body of these estimates, a few explanatory notes seem desirable.

Basic Plans. As is stated in the body of the report, this Board prepared its estimates upon the general project plan contemplated in the Cooper and the U. S. Engineers estimates. For the general type and character of the structures, the Board has used what it considers to be the best available designs, (or slight modifications thereof) based on the results of the latest field studies and investigations.

Quantities. Estimates of quantities represent the Board's best judgment of probable requirements, based either on its own computations or on verification of computations or estimates already made.

Unit prices. In the body of the report it is explained that the unit prices used throughout these estimates are deemed to be fair contract bid prices, taking into account all local conditions which will tend to affect the cost of the work.

Hydraulic and Electrical Machinery. Generally speaking, the estimates of the U. S. Engineers for hydraulic turbines, electric generators, etc., are based on recent manufacturers' figures furnished for this purpose; the Board has accepted these prices as verified by examination of such manufacturers' figures. In estimating costs of the remaining items of mechanical and electrical equipment, the Board has had access to the large fund of information available regarding such matters in the Denver office of the U. S. Bureau of Reclamation, in addition to the somewhat detailed estimates of these items available at Eastport.

Housing. (Quoddy Village and Field Labor Camps) With additions to present expenditures, for construction or completion of roads, sidewalks, utility services and probably some additional housing, the Board estimates that the total cost of this item will approximate $2,400,000. The net returns from house rentals and utility services is estimated by the U. S. Engineers at $450,000, and the final salvage value of the property, including furnishings and equipment, they estimate at $300,000. The final net cost, therefore, is estimated by the Board at $1,650,000.

General Overhead. This item is intended to cover all general costs of both Division and District headquarters that are not directly or readily allocable to specific project features. It would include practically all of the preliminary investigations, purchase of the Cooper data and rights, general consulting services, general supervision and general office expense including accounting, the construction and operation of testing laboratories, the services of outside testing laboratories, etc. The allowance made for "General Overhead" is 6% of all costs, which, we are informed, is about the average U. S. Engineers record for overhead costs on other comparable projects.

Interest during Construction. The assumption concerning this item is an interest rate of 3% per annum on the total cost of project, for one-half of an assumed average construction period of three and one-half years. This means an addition, for this item, of 5¼%, and it is applied, as a single item, in the final "Summary Estimate of Entire Project."

Appendix B.

Detailed Cost Estimate of Division I.

Navigation Lock

Filling Gates.

Eastport Dam.

Dudley Island Dam.

Lubec Dam.

Navigation Lock.

Location of Lock is at North end of Treat Island. Lock Chamber, 56'x360', provided with Sector Gates with Sill at elevation-25.5; guide walls at each end, 360' long; total length of Lock,1155'. The structure proper is of concrete throughout. (Army Drawing No. A-1-239)

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Cofferdams (Rock plugs with clay fill backing) and cost of dewatering foundations during construction.	Job.	-	L.S.	15,000
2.	Excavation.				
a.	Rock excavation (dry), 335,000 cu. yds.,with thin overburden of earth, 5,000 cu.yds.,all to be taken out together.	cu. yd.	340,000	1.25	425,000
b.	Rock excavation (subaqueous).	"	29,000	5.00	145,000
c.	Earth dredging.	"	27,000	0.25	6,750
	Total for Item 2.				576,750
3.	Rock Chaneling and Grouting.				
a.	Close drilling and broaching	sq. ft.	75,000*1	1.00	75,000
b.	Drilling and grouting dowel holes (3" diam.).	lin.ft.	15,000	1.00	15,000
c.	Grouting rock seams.	Job.	-	L.S.	6,000
	Total for Item 3.				96,000
4.	Channel Markers.	One	5	4,200	21,000
5.	Concrete Work.				
a.	Concrete (6 bag mix).exc. of reenforcement.	cu.yd.	23,000	11.00	253,000
b.	Reenforcing Steel.	lb.	277,000	0.05	13,850
	Total for Item 5.				266,850
6.	Metal Work.(exc. of reenf.steel).				
a.	Structural Steel.	lb.	1,753,000	0.07	122,710
b.	Castings, steel.	"	40,000	0.12	4,800
c.	" , nickel steel (hinges and pintle).	"	95,300	0.20	19,060
d.	Castings, iron.	"	146,500	0.08	11,720
e.	Forgings, steel.	"	4,100	0.20	820
f.	" , nickel steel (pins)	"	30,400	0.40	12,160
g.	Phosphor Bronze.	"	10,900	0.60	6,540
h.	Grating Steel.	sq.ft.	475	1.20	570
	Total for Item 6.				178,380

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
7.	Miscellaneous Items.				
a.	Handrail	lin.ft.	30	2.00	60
b.	Rubber Seals	lb.	10,100	0.80	8,080
c.	Timber Gate Fenders (White Oak).	M.Ft. b.m.	14:150		2,100
d.	Water Level Control Units.	one	2:400		800
e.	Electrical Conduit System (embeded)	job	-	L.S.	4,700
f.	Power, light, and control wiring for Lock.	"	-	"	11,700
g.	Haulage Units.	one	2:1,355		2,710
h.	Air and Signal System.	job	-	L.S.	600
i.	Floating Mooring Bits.	one	4:1,000		4,000
j.	Guard Chains.	"	4:2,000		8,000
k.	Bascule Bridge facilities. *2	job	-	L.S.	5,200
	Total for Item 7.				47,950
8.	Gate Operating Machinery.	job	-	L.S.	18,000
9.	Central Control Station.	job	-	L.S.	22,500
10.	Lock Operators Houses. *3	one	2:3,000		6,000
11.	Sub-total.				1,248,430
12.	Engineering, 5% of Item 11.				62,400
13.	Contingencies, 15% of Item 11.				187,300
14.	Total = Gross Cost of Lock				1,498,130
15.	Credit for rock from Lock excavation used in dams. Assuming a swell of 40% from solid rock to loose rock measurement and allowing 70¢ per cu.yd. for the latter, this credit amounts to,	cu.yd.	509,000	0.70	356,300
					1,141,830
16.	Net Cost of Lock.(Item 13-Item 14)			(Call it)	1,142,000

*1 This is the quantity shown in the call for bids for lock excavation and not that shown in Army's preliminary estimate.

*2 This is to cover certain provisions that should be made in the present construction for the installation of a bascule bridge by state or local authorities when they develop the highway between Eastport and Lubec.

*3 It is here assumed that two of the "Type C" houses in "Quoddy Village" will be moved to the Lock to serve as operators houses. It is believed that an allowance of $3,000 per house is ample to cover the salvage credit to "Quoddy Village," the cost of moving, and the cost of necessary adjustments for utility services, refitting, etc., at the new location.

Filling Gates.

15 Open Sluice, Double Leaf, Stoney Roller Gates located at South end of Treat Island. These gates have a sill elevation of -30', are 60' wide in the clear and are approximately 42' high. Channel elevation, -40'.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Cofferdam. (Rock plug with earth dike where required). Includes the placement and removal of earth fill dike with concrete core wall and rock riprap slope protection and of dewatering cofferdam area during construction.	job	-	L.S.	175,000
2.	Excavation.				
a.	Earth overburden (dry)	cu.yd.	223,000	0.30	66,900
b.	" " (dredge outside of cofferdam).	"	328,000	0.25	82,000
c.	Rock (dry)	"	2,554,000	1.00	2,554,000
d.	" outside of cofferdam. (Subaqueous).	"	253,000	4.50	1,138,500
e.	Rock in cofferdam plug. (1/3 Subaqueous).	"	852,000	2.25	1,917,000
	Total for Item 2.				5,758,400
3.	Embankment. No pay quantity. Excavated material to be placed in dams and coffer-dams or wasted near site of work.	-	-	-	-
4.	Channeling and Drilling.				
a.	Drilling and Broaching.	sq.ft.	60,000	1.00	60,000
b.	Drilling and Grouting test holes (6" diam.)	lin.ft.	6,900	3.00	20,700
c.	Drilling and Grouting dowel holes (3" diam.)	"	3,050	1.00	3,050
	Total for Item 4.				83,750
5.	Concrete Work.				
a.	Piers, abutments and aprons (Class B)	cu.yd.	120,000	13.00	1,560,000
b.	Highway Deck (Class A)	"	800	15.00	12,000
c.	Pressure Grouting of dowel holes	cu.ft.	14,000	2.00	28,000
d.	Reenforcing Steel	lb.	1,800,000	0.05	90,000
	Total for Item 5.				1,690,000

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
6.	Metal Work (exc.of reenf.steel):				
a.	Structural Steel-Stoney Gates:	lb.	4,210,000	0.07	294,700
b.	" " -Stop Logs.	"	840,000	"	58,800
c.	" " -Gantry Girders.	"	960,000	"	67,200
d.	Structural Steel-Highway Bridge.	"	1,954,000	"	136,780
e.	Structural Steel-Embeded and attached.	"	600,000	"	42,000
f.	Rail and rail fastenings.	"	131,000	0.03	3,950
g.	Castings, steel. (Bridge shoes, 70,200#)	"	198,000	0.15	29,700
h.	Castings, iron, Class A.	"	1,050,000	0.05	52,500
i.	" , " , " B. (Counterweight).	"	4,210,000	.025	105,250
j.	Forgings, steel.	"	10,400	0.15	1,560
	Total for Item 6.				792,420
7.	Miscellaneous Items.				
a.	Handrail, service bridge (2" diam. pipe).	lin.ft.	2,340	2.00	4,680
b.	Handrail, highway bridge (3" diam. pipe).	"	2,340	3.00	7,020
c.	Rubber seals.	lb.	15,000	1.00	15,000
	Total for Item 7.				26,700
8.	Operating Equipment.				
a.	Gantry Crane (100 ton), complete with controls, power trolley and appurtenances	One	1	45,000	45,000
b.	Operating machinery Units, complete with chain	"	15	11,400	171,000
c.	Operating Machinery Houses.	"	15	1,000	15,000
d.	Light and power, wiring, accessories and controls	one set	15	600	9,000
e.	Operating Control Station, complete.	One	1	25,000	25,000
f.	Heater Systems, complete with controls.	"	15	1,500	22,500
g.	Maintenance Depot and Machine shop.	"	1	15,000	15,000
h.	Counterweight, Well Drainage System, complete with system header line, sump, pump and machinery.	"	1		10,000
	Total for Item 8.				312,500

Filling Gates (Continued)

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
9.	Highway Lighting System.	job.	-	L.S.	3,000
10.	Gate Operators Houses *1	one.	3	3,000	9,000
11.	Sub-total.				8,850,700
12.	Engineering, 5% of Item 11.				442,600
13.	Contingencies, 15% of Item 11.				1,327,600
14.	Total = Gross Cost of Filling Gates.				10,620,900
15.	Credit for rock from Filling Gates excavation used in dams. Assuming a swell of 40% from solid rock to loose rock measurement and allowing 70¢ per cu. yd. for the latter, this credit amounts to,	cu.yd.	5,122,600	0.70	3,585,820
16.	Net Cost of Filling Gates. (Item 14-Item 15).				7,035,080
				Call it	7,035,000

*1 It is here assumed that three of the "Type C" houses in "Quoddy Village" will be moved to the Filling Gates to serve as operators houses. It is believed that an allowance of $3,000 per house is ample to cover the salvage credit to "Quoddy Village," the cost of moving, and the cost of necessary adjustments for utility services, refitting, etc., at the new location.

Eastport Dam.

A Rockfill Dam, with earth blanket on Cobscook Bay side, extending from Moose Island to Treat Island. Length, 3460'; maximum height above channel bed, 138'; maximum depth to rock below channel bed, 147'. For section of dam, see Plate II.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Rock Sections of Dam.				
a.	Below El.-30': Net Section, 2,130,000 cu.yds; +10% for waste and drift, 213,000 cu. yds.; +60% for settlement, 1,278,000 cu. yds.	cu.yd.	3,621,000	0.85	3,077,850
b.	Above El.-30': Net Section, 708,000 cu. yds; +10% for waste and drift, 70,800 cu. yds.; +60% for settlement, 424,800 cu. yds.	"	1,204,000	2.25 *1	2,709,000
	Total for Item 1.				5,786,850
2.	Earth Section of Dam. Net Section, 1,779,000 cu. yds.; +10% for waste and drift,177,900 cu. yds.	"	1,957,000	0.40	782,800
3.	Preparing Abutment Connections of Dam	job	-	L.S.	50,000
4.	Riprap between El.-14' and El. +20'.	cu.yd.	63,000	3.50	220,500
5.	Roads, Docks and Miscellaneous.	job	-	L.S.	60,000
6.	Sub-total.				6,900,150
7.	Engineering, 5% of Item 6.				345,000
8.	Contingencies, 15% of Item 6				1,035,000
					8,280,150
9.	Total			(Call it)	8,280,000

*1 This unit price is made up thus:- 50%, large rock at $3.50 per cu. yd., and 50%, quarry-run rock at $1.00 per cu. yd., makes an average of $2.25 per cu. yd. for all rock above El. -30'.

Dudley Island Dam.

A Rockfill Dam, with earth blanket, on Cobscook Bay side, extending from Treat Island to Dudley Island. Length, 1,000'; maximum height, above channel bed, 70'; maximum depth to rock below channel bed, 80'. For section of dam, See Plate II.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Rock Sections of Dam.				
a.	Below El.-30':- Net Section, 47,000 cu. yds.; +10% for drift and waste, 4,700 cu. yds.; +60% for settlement, 28,200 cu. yds.	cu.yd.	80,000	0.85	68,000
b.	Above El.-30':- Net Section, 94,000 cu. yds.; +10% for drift and waste, 9,400 cu. yds.; +60% for settlement, 56,400 cu. yds.	"	160,000	2.25 *1	360,000
2.	Earth Section of Dam. Net Section, 72,000 cu. yds., +10% for drift and waste, 7,200 cu. yds.	"	79,000	0.40	31,600
3.	Preparing Abutment Connections of Dam.	Job	-	L.S.	2,000
4.	Riprap between El.-14' and El.+20'.	cu.yd.	16,000	3.50	56,000
5.	Roads, Docks and Miscellaneous	Job	-	L.S.	3,000
6.	Sub-total.				520,600
7.	Engineering, 5% of Item 6.				26,000
8.	Contingencies, 15% of Item 6				78,000
9.	Total				624,600 625,000

*1 This unit price is made up thus:- 50%, large rock at $3.50 per cu. yd. and 50%, quarry-run rock at $1.00 per cu. yd., makes an average of $2.25 per cu. yd. for all rock above El.-30'.

Lubec Dam.

A Rockfill Dam, with earth blanket on Cobscook Bay side, extending from Dudley Island to Lubec. Length, 3720'; maximum height above channel bed, 84'; maximum depth to rock below channel bed, 130'. For section of dam, see Plate II.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Rock Sections of Dam.				
a.	Below El.-30': Net Section, 690,000 cu. yds.; +10% for drift and waste, 69,000 cu. yds.; +60% for settlement, 414,000 cu. yds.	cu. yd.	1,173,000	0.85	997,050
b.	Above El.-30': Net Section, 711,000 cu. yds.; +10% for drift and waste, 71,100 cu. yds.; +60% for settlement, 426,600 cu. yds.	"	1,209,000	2.25*1	2,720,250
2.	Earth Section of Dam. Net section, 844,000 cu. yds.; +10% for waste and drift, 84,400 cu. yds.	"	928,000	0.40	371,200
3.	Preparing Abutment Connections of Dam.	job.	-	L. S.	18,000
4.	Riprap between El.-14' and El.+20'.	cu.yd.	72,000	3.50	252,000
5.	Roads, Docks and Miscellaneous.	job.	-	L. S.	40,000
6.	Sub-total.				4,398,500
7.	Engineering, 5% of Item 6.				219,900
8.	Contingencies, 15% of Item 6.				659,800
9.	Total			Call it	5,278,200 5,278,000

*1 This unit price is made up thus:- 50%, large rock, at $3.50 per cu. yd., and 50%, quarry-run rock at $1.00 per cu. yd., makes an average of $2.25 per cu. yd. for all rock above El.-30'.

Summary, by Main Project Features, of Cost of Division I.

Item No.	Item	Amount $
1.	Navigation Lock (Net cost after credits).	1,142,000
2.	Filling Gates (" " " ").	7,035,000
3.	Eastport Dam	8,280,000
4.	Dudley Island Dam	625,000
5.	Lubec Dam	5,278,000
6.	Sub-total	22,360,000
7.	Rights of Way (Land acquisition)	25,000
8.	Total for Division I, exclusive of "General Overhead," "Interest during Construction," and "Quoddy Village", which items will be included in the "Summary for Entire Project."	22,385,000

Appendix C.

Detailed Cost Estimate of Division II.

Pleasant Point Dam.

Carlow Island Dam.

Passamaquoddy Tidal Power Station.

Permanent Railroad and Highway Construction.

Pleasant Point Dam.

A Rockfill Dam, with earth blanket on Cobscook Bay side, extending from Pleasant Point to Carlow Island, along the line of existing railroad and highway trestles. Length of Dam, 3200'; maximum height above channel bed, 47'; depth to bed rock, not known. For section of dam see Plate III.

Item No.	Item	Unit	Quantity	Unit Cost	Amount
1.	Rockfill Section of Dam.*1	cu.yd.	82,000	2.00*2	164,000
2.	Earthfill Section of Dam.*1	"	40,000	0.40	16,000
3.	Riprap.	"	15,000	3.50	52,500
4.	Replacing Poles (Utility services).	one-	28	45.00	1,260
5.	Raising railroad track.	lin.ft.	2,800	5.00	14,000
6.	Removing existing structures.	job	-	L.S.	9,000
7.	Sub-total.				256,760
8.	Engineering, 5% of Item 7.				12,800
9.	Contingencies, 15% of Item 7.				38,500
					308,060
10.	Total.			Call it	308,000

*1 The quantities shown include an allowance of approximately 10% for settlement and drift.

*2 Unit price high account including the cost of opening up a relatively small quarry pit with substantial overburden.

Carlow Island Dam

A Rockfill Dam, with earth blanket on Cobscook Bay side, extending from Carlow Island to the northerly point of Moose Island, along the line of existing railroad and highway trestles. Length of dam, 1392'; maximum height above channel bed, 28'; depth to bed rock, not known. For section of dam, see Plate III.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Rockfill Section of Dam *1	cu.yd.	68,000	2.00*2	136,000
2.	Earthfill Section of Dam *1	"	25,000	0.40	10,000
3.	Riprap.	"	7,200	3.50	25,200
4.	Replacing Poles (Utility services).	one	12	45.00	540
5.	Raising railroad track.	lin. ft.	800	5.00	4,000
6.	Removing existing structures.	job	job	L.S.	1,000
7.	Sub-total.				176,740
8.	Engineering, 5% of Item 7.				8,800
9.	Contingencies, 15% of Item 7.				26,500
10.	Total.			Call it	212,040 212,000

*1 The quantities shown include an allowance of approximately 10% for settlement and drift.

*2 Unit price high account including cost of opening up a relatively small quarry pit with substantial overburden.

Passamaquoddy Tidal Power Station.

A concrete Power House located at Carryingplace Cove (See Plate I.) The installation consists of 10 Generator Units of 12,250 k.w. capacity each at 0.9 P.F. (13.8 Kv.), together with all hydraulic and electrical accessories.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Headrace and Tailrace Channels and Cofferdam.				
a.	Cofferdams, and unwatering foundations.	job.	-	L.S.	300,000
b.	Dredging, earth.	cu.yd.	6,420,000	0.20	1,284,000
	Total for Item 1.				1,584,000
2.	Earthfill Dam at Power House.				
a.	Earthfill.	cu.yd.	150,000	0.15	22,500
b.	Wakefield Sheet Piling.	lin.ft.	54,000	1.00	54,000
c.	Riprap.	cu.yd.	8,500	3.50	29,750
	Total for Item 2.				106,250
3.	Power House Substructure.				
a.	Earth Excavation.	cu.yd.	580,000	0.40	232,000
b.	Rock "	"	150,000	2.50	375,000
c.	Concrete, inc. forms.*1	"	240,000	15.00	3,600,000
d.	Reenforcing Steel.	ton	8,400	100.00	840,000
e.	Waterproofing.	sq.ft.	136,000	0.50	68,000
f.	Seals, drains and grouting.	job.	-	L.S.	120,000
g.	Structural Steel and miscellaneous metal.	"	-	"	125,000
h.	Gantry Transformer and R. R.Rails	lin.ft.	7,800	3.50	27,300
	Total for Item 3.				5,387,300
4.	Power House Superstructure.				
a.	Generator Room.	cu.ft.	4,530,000	0.22	996,600
b.	Office.	"	45,000	-	28,000
c.	Control Room.	"	96,000	-	50,000
d.	Low Tension Switch Rooms.	"	140,000	-	40,000
	Total for Item 4.				1,114,600
5.	Headgates, Stop Logs and Trash Racks.				
a.	Headgate Guides.	lb.	500,000	0.12	60,000
b.	Trash Rack Guides.	"	500,000	0.12	60,000
c.	Draft Tube Stop Log Guides.	"	346,000	0.10	34,600
d.	Headgates.	"	712,000	0.14	99,680
e.	Draft Tube Stop Logs.	"	422,000	0.08	33,760
f.	Trash Racks.	"	2,100,000	0.08	168,000
g.	Trash Rake.	-	-	L. S.	5,000
	Total for Item 5.				461,040
6.	Crane Equipment, including 1 - 60 Ton Headworks Gantry, 1 - 20 Ton Stop Log Gantry, 2 - 150 Ton Turbine Room Cranes and 1 - 15 Ton Machine Shop Crane.	Lot	-	L. S.	140,000

*1 Granite facing included in the Army estimate eliminated and an equivalent amount of rich concrete has been provided for in this estimate.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
7.	Hydraulic Turbines with Governors.	One	10	500,000	5,000,000
8.	Mechanical Service Equipment.				
a.	Unwatering System.	job.	-	L.S.	58,000
b.	Heating and Ventilating System.	"	-	"	76,000
c.	Plumbing and Station Service.	"	-	"	15,000
d.	Generator Cooling Water System.	"	-	"	42,000
e.	Fire Protection. (CO_2 and Water).	"	-	"	46,000
f.	Compressed Air Systems.	"	-	"	32,000
g.	Oil Storage and Purification.	"	-	"	40,000
h.	Power House Drainage System	"	-	"	25,000
i.	Piping Valves, Specialties and Insulation.	"	-	"	71,000
j.	Machine Shop.	"	-	"	31,000
k.	Mechanical Gages and Instruments.	"	-	"	27,000
l.	Diesel Electric Unit (500 k.w.).	"	-	"	75,000
m.	Painting Equipment.	"	-	"	6,000
	Total for Item 8.				544,000
	Electrical Equipment and Structures.				
9.	PowerHouse General Service.				
a.	Lighting System.	job.	-	L.S.	33,000
b.	Telephone and Communication System.	"	-	"	20,000
c.	Yard Lighting.	"	-	"	3,800
	Total for Item 9.				56,800
10.	Intake:-Light,Power and Telephone System.				
a.	Gate Heaters.	job.	-	L.S.	15,000
b.	Head works, Lighting Standards.	"	-	"	5,000
c.	Gantry Trolley.	"	-	"	3,200
d.	Cable.	"	-	"	2,500
e.	Gate Control, Conduits and Miscellaneous.	"	-	"	4,700
	Total for Item 10.				30,400
11.	Tailrace:-Light,Power and Telephone System.				
a.	Crane Trolley	job.	-	L.S.	3,200
b.	Lighting Standards.	one	20	250	5,000
c.	Conduits, Cables and Miscellaneous	job.	-	L.S.	2,800
	Total for Item 11.				11,000
	Main Power Equipment.				
12.	Generators,(Units of 12,250 k.w.; 0.9 P.F.;13.8 kv.)				
a.	Generator Units inc. Direct-Connected Exciters.	one.	10	315,000	3,150,000
b.	Motor Driven Exciters (1 spare).	"	9	9,000	81,000
c.	Air Filters.	job.	-	L.S.	20,000
d.	Fire Protection	"	-	"	5,000
	Total for Item 12.				3,256,000

Item No.	Item	Unit	Quantity	Unit Cost $	Amount
13.	Main Switching Control and Protective Equipment.				
a.	Oil Circuit Breakers.	job.	-	L.S.	298,000
b.	Disconnecting Switches.	"	-	"	24,000
	Total for Item 13.	"			322,000
14.	Some Minor Equipment.				
a.	Control Switch Board.	job.	-	L.S.	64,000
b.	Frequency Load Control.	"	-	"	12,000
c.	Totalizing and Recording.	"	-	"	17,000
d.	Voltage Regulator Board.	"	-	"	11,000
e.	Relay Board.	"	-	"	43,000
f.	Terminal Boxes and Boards.	"	-	"	28,000
g.	Excitation Board.	"	-	"	7,500
h.	Miscellaneous Interlocks.	"	-	"	12,000
i.	Signal Pedestals, Gage Boards and Miscellaneous.	"	-	"	19,000
	Total for Item14.				213,500
15.	Instrument Transformers and Equipment.				
a.	Current Transformers.	job.	-	L.S.	18,000
b.	Potential.	"	-	"	6,300
c.	Registers and Fuses.	"	-	"	4,800
	Total for Item 15.				29,100
16.	Compartments.				
a.	Concrete Work (Partitions,etc.)	job.	-	L.S.	134,000
b.	Compartment Doors.	"	-	"	60,000
c.	Alberne and Precast Concrete.	"	-	"	11,000
	Total for Item 16.				205,000
17.	Power Cable.				
a.	Cable and Connections.	lb.	100,000	0.70	70,000
b.	Excitation Cable.	"	6,000	0.50	3,000
c.	D.C. Cable.	"	10,000	0.50	5,000
	Total for Item 17.				78,000
18.	Bus and Connections.				
a.	Copper and Connections.	lb.	28,000	0.50	14,000
b.	Bus Supports (15 kv.)	job.	-	L.S.	51,000
c.	Bushings.	"	-	"	9,000
	Total for Item 18.				74,000
	Station Service.				
19.	Control Equipment.				
a.	Metal Clad Switch Board (2300 V.)	job.	-	L.S.	26,000
b.	Switch Board (440 V.)	"	-	"	23,000
c.	Lighting and Small Power Board.	"	-	"	6,000
d.	D.C. Board.	"	-	"	10,000
e.	Battery Board.	"	-	"	2,200
f.	Miscellaneous Boards and Grille Work	"	-	"	5,000
	Total for Item 19.				72,200

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
20.	Instrument Transformers.				
a.	Current Transformers.	job.	-	L.S.	1,800
b.	Potential.	"	-	"	400
	Total for Item 20.				2,200
21.	Some Minor Equipment.				
a.	Starting Equipment.	job.	-	L.S.	12,500
b.	Station Crane Trolley.	"	-	"	4,000
c.	Miscellaneous Supports.	"	-	"	2,000
	Total for Item 21.				18,500
22.	Auxiliary Switching.				
a.	Cable.	job.	-	L.S.	67,000
b.	Concrete Partitions and Compartment Doors.	"	-	"	6,800
c.	Bus and Bus Supports.	"	-	"	3,000
d.	Power Plugs and Miscellaneous.		-	"	6,500
	Total for Item 22.				83,300
23.	Auxiliary Power Equipment.				
a.	Station Service Transformers (3 phase - 3500 kv-a.)	one.	2	10,700	21,400
b.	Station Service Transformers (2 phase - 2000 kv-a.)	"	2	7,000	14,000
c.	Station Service Transformers (1 phase - 300 kv-a.)	"	2	1,500	3,000
d.	Main Station Ground.	job.	-	L.S.	10,000
e.	Induction regulators, Storage Battery, Battery Charging Sets and Miscellaneous.	"	-	L.S.	14,600
	Total Item 23.				63,000
	General Electrical Equipment.				
24.	Conduits, Fittings and Racks.	job.	-	L.S.	180,000
25.	Expansion Joints, Inserts and Miscellaneous.	job.	-	L.S.	17,000
	Transmission Substation.				
26.	Main Power Transformers.				
a.	Units of 18,800 kv-a, 3 phase.	one.	6	54,600	327,600
b.	Connections.	job.	-	L.S.	3,000
c.	Transfer Truck.	one.	1	2,000	2,000
	Total for Item 26.				332,600
27.	Oil Circuit Breakers (1,500,000 kv-a.)	job.	-	L.S.	134,000

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
28.	Minor Items of Equipment, etc.				
a.	Air Break Switches.	job.	-	L.S.	6,800
b.	Disconnecting Switches.	"	-	"	20,000
c.	Lightning Arresters.	"	-	"	12,000
d.	Outdoor Metering.	"	-	"	4,000
e.	Cable and Connections (Control)	"	-	"	8,000
f.	Conduit and fittings.	"	-	"	11,000
g.	Bus and Connections	"	-	"	12,500
h.	Interlocks and Painting.	"	-	"	6,000
i.	Structural Steel.	"	-	"	18,000
j.	Station Ground.	"	-	"	2,000
k.	Substation Lighting, Telephone and Miscellaneous.	"	-	"	7,000
	Total for Item 28.				107,300
29.	Control Building and Substation.	job.	-	L. S.	28,000
30.	Local Feeders and Roadway Lighting.	"	-	"	55,000
31.	Sub-total.				19,706,090
32.	Engineering, 5% of Item 31.				985,300
33.	Contingencies.				
a.	On Hydraulic and Electrical Machinery.(5% of 9,400,000)				470,000
b.	" the Remainder of Item 31.(15% of 10,306,090)				1,545,900
					22,707,290
34.	Total.			Call it	22,707,000

Permanent Railroad and Highway Construction.

Necessary railroad and highway changes include trestle abandonment and raising of roadway across Pleasant Point and Carlow Island Dams (See estimates for those dams); the construction of bridges across the Power House Tailrace Channel at Johnson Cove, together with approaches thereto; and some reconstruction due to realinement. (See Plate I)

Item No.	Item	Unit	Quantity	Unit Cost $	Amount
1.	Providing a temporary highway	job.	-	L.S.	10,000
2.	Relocation of telegraph, telephone, power and water lines.	job.	-	L.S.	30,000
3.	Substructure for Railroad and Highway Bridges, including excavation, sheeting, pumping, forms and the construction of reenforced concrete piers.	job.	-	L.S.	280,000*1
4.	Railroad Bridge Superstructure, complete, including structural steel, cast steel, all necessary track work, etc.	job.	-	L.S.	85,000
5.	Railroad Approaches.				
a.	Clearing and Grubbing.	job.	-	L.S.	1,000
b.	Removing existing structures.	"	-	L.S.	1,000
c.	Earth excavation.	cu.yd.	55,000	0.30	16,500
d.	Rock Excavation.	"	100,000	1.00	100,000
e.	Bridge and Culverts.	job.	-	L.S.	10,000
f.	Track, including ballasting.	lin. ft.	7,450	5.00	37,250
g.	Fences.	"	15,000	0.10	1,500
h.	Pile Trestle (Untreated)	"	700	20.00	14,000
i.	Telegraph Line	"	8,800	0.75	6,600
	Total for Item 5.				187,850
6.	Highway Bridge Superstructure, complete, including structural steel, cast steel, reenforced concrete flooring, railings, drains, expansion joints, lighting, etc.	job.	-	L.S.	190,000
7.	Highway Approaches.	job.	-	L.S.	30,000
8.	Station Yard Work, including sidings and switches and miscellaneous grading.	job.	-	L.S.	20,000
9.	Sub-total.				832,850
10.	Engineering, 5% of Item 9				41,600

Permanent Railroad and Highway Construction (Continued).

Item No.	Item	Unit	Quantity	Unit Cost $	Amount
11.	Contingencies, 15% of Item 9.				125,000
					999,450
12.	Total			Call it:	1,000,000

*1 The granite facing for piers provided in the Army estimates have been eliminated and an equivalent amount of rich concrete has been provided for in this estimate.

Summary, by Main Project Features, of Cost of Division II.

Item No.	Item	Amount $
1.	Pleasant Point Dam.	308,000
2.	Carlow Island Dam.	212,000
3.	Passamaquoddy Tidal Power Station	22,707,000
4.	Permanent Railroad and Highway Construction	1,000,000
5.	Sub-total.	24,227,000
6.	Rights of Way (Land acquisition).	30,000
7.	Total for Division II, exclusive of "General Overhead","Interest during Construction," and "Quoddy Village" which items will be included in the "Summary for Entire Project".	24,257,000

Appendix D.

Detailed Cost Estimate of Division III.
Haycock Pump Storage Project.

Reservoir Dams.

Power and Pumping Station.

Transmission Line and Substation.

Reservoir Dams.

These comprise a series of 13 relatively small earth dikes or dams, ranging in height from 10' to 80' (a few with concrete abutment sections) and one concrete dam 110' high, for Power House Intake Structure, Estimate for the latter is included elsewhere under the heading "Intake Structure and Penstock." All of these dams pertain to Haycock Reservoir. (See Plates I and IV.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Reservoir Clearing. *2	acre	4,000	80.00	320,000
2.	Clearing and Grubbing.	"	110	200.00	22,000
3.	Earth Excavation, including stripping.	cu.yd.	360,000	0.50	180,000
4.	Rock Excavation.	"	4,200	2.50	10,500
5.	Dam Embankments.	"	4,600,000	0.50	2,300,000
6.	Rockfill (at toe of dam).	"	50,000	2.00	100,000
7.	Concrete in Cutoff Walls.	"	1,000	20,00	20,000
8.	Concrete in Dams. *1	"	18,000	10.00	180,000
9.	Reenforcing Steel.	lb.	20,000	0.06	1,200
10.	Drilling and Grouting.	job.	-	L.S.	100,000
11.	Riprap (2' thick).	cu.yd.	130,000	2.50	325,000
12.	Seeding.	acre	42	1,000.00	42,000
13.	Highway Relocation.	job.	-	L.S.	75,000
14.	Stream Care during Construction.	"	-	"	50,000
15.	Sub-total.				3,725,700
16.	Engineering, 5% of Item 15.				186,300
17.	Contingencies, 15% of Item 15.				558,900
18.	Total			Call it	4,470,900 4,471,000

*1 The Granite facing provided in Army estimate has been eliminated and an equivalent volume of concrete (2,000 cu. yds.) has been added to Item 8.

*2 While this item is more properly a reservoir charge it is here included in the estimate for dams as a matter of convenience.

Power and Pumping Structure.

This contemplates a concrete structure housing 8 Main Generators of 10,710 kv-a. capacity each, 8 Pump-Turbines of 12,000 h.p. capacity each, and auxiliary equipment required for these main Units. Power House dimensions are 56' x 429' with foundation provision for a 195' extension.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Power House Site Improvements.	job.	-	L.S.	10,000
2.	Power House Substructure.				
a.	Cofferdam and Unwatering.	job.	-	L.S.	60,000
b.	Earth and Loose Rock Excavation	cu.yd.	12,000	0.40	4,800
c.	Rock Excavation, including foundation preparation.	"	100,000	3.00	300,000
d.	Concrete. *1	"	26,200	15.00	393,000
e.	Reenforcing Steel.	ton.	468	120.00	56,160
f.	Interior finish and Trim.	job.	-	L.S.	20,000
	Total for Item 2.				833,960
3.	Power House Superstructure.				
a.	Generator Bay.	cu.ft.	880,000	0.25	220,000
b.	Electrical Bay.	"	649,000	0.50	324,500
c.	Control Offices and Work Bays.	"	309,000	0.50	154,500
d.	Stop log Runway Equipment.	"	165,000	0.25	41,250
	Total for Item 3.				740,250
4.	Tailrace.				
a.	Earth and Loose Rock Excavation	cu.yd.	76,000	0.40	30,400
b.	Rock Excavation.	"	255,000	1.50	382,500
c.	Power House Handling Equipment.	job.	-	L.S.	95,000
d.	Stoplog Runway Equipment.	"	-	"	90,000
	Total for Item 4.				597,900
5.	Intake Structure and Penstocks.				
a.	Intake)Earth and L.R.Excavation.	cu.yd.	6,000	0.40	2,400
b.	Sub-)Rock Excavation.	"	34,000	3.00	102,000
c.	struct-)Concrete inc.Exp.Joints				
	ure.) and Drains.	"	79,000	11.50	908,500
d.	)Reenforcing Steel.	ton.	700	120.00	84,000
e.	Intake Superstructure.	cu.ft.	256,000	0.25	64,000
f.	Intake Equipment (Gates, operating machinery, etc.).	job.	-	L.S.	240,000
g.	Penstocks.	"	-	"	210,000
	Total for Item 5.				1,610,900
	Hydraulic Pump-Turbines and Mechanical Equipment.				
6.	Pump-Turbine Units;12,000 h.p.each 92.5" throat diameter; 128.6 r.p.m. generating; complete with governor equipment and spare parts	one.	8	150,000	1,200,000

*1 Granite facing included in the Army estimate has been eliminated and an equivalent amount of concrete (500 cu. yds.) has been added to Item 2-d.

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
7.	Diesel Unit (500 k.w.)	job.	-	L.S.	75,000
8.	Fire Protection Systems.	job.	-	"	68,000
9.	Auxiliary Equipment for Generator Cooling System.	"	-	"	42,000
10.	Filtering and Purifying Systems.	job.	-	L.S.	39,000
11.	High and Low Pressure Air Systems.	"	-	"	28,000
12.	Heating System complete with boiler, unit heater, etc.	"	-	"	38,000
13.	Ventilating System for Electrical Bay.	"	-	"	18,000
14.	Machine Shop Equipment.	"	-	"	25,000
15.	Measuring Equipment and Gages.	"	-	"	27,000
16.	Minor Equipment Items.				
a.	Plumbing and Water Supply System	"	-	"	6,000
b.	Drainage System.	"	-	"	11,000
c.	Painting and Pipe Covering.	"	-	"	10,000
d.	Vacuum Cleaning System.	"	-	"	10,000
e.	Main Unit Unwatering Pump System.	"	-	"	8,000
f.	Portable Filter Press for OCB.	one.	1	500	500
	Total for Item 16.				45,500
	Electrical Equipment.				
17.	Eight Main Generators (10,710 kv-a.; 80% P.F.; 13.8 kv.; 128.6 r.p.m.) together with eight motors (21,300 h.p.; 100% P.F.; 13.8 kv.; 171.3 r.p.m.), including air filters and fire protection.	job.	-	L.S.	2,200,000
18.	Oil Circuit Breakers, disconnecting switches, neutral resistors, auto starting transformers, control equipment, switchboard and equipment, compartments and compartment structures, cables, bus bars and connections, interlocking System, and generator leads for 13.8 kv. system.	job.	-	L.S.	650,000
19.	Auxiliary Switching, control, protective equipments including auxiliary switchboards, annunciators, starting equipment, power and control cables and interlocks.	job.	-	L.S.	120,000

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
20.	Auxiliary Power Transformers, storage batteries, and charging equipment, and station grounding.	job.	-	L.S.	60,000
21.	Inserts, conduit and fittings, miscellaneous structural steel and pipe framework.	job.	-	L.S.	90,000
22.	Lighting, telephone and communication systems for power house and yard.	job.	-	L.S.	60,000
23.	Lighting, power circuits, telephone communication, power and control cables, motor equipment, signal system, and highway lighting, for Intake.	job.	-	L.S.	15,500
24.	Lighting, power, signal, and telephone systems for tailrace equipment.	job.	-	L.S.	5,300
25.	One spare motor-driven exciter of 150 K.W. capacity (250 Volt).	job.	-	L.S.	7,500
26.	Spare parts and miscellaneous.	job.	-	L.S.	145,000
27.	Operators Village.				
a.	Houses for Operators. *1	one.	10	4,000	40,000
b.	Roadways and Utility Services	job.	-	L.S.	60,000
	Total for Item 27.				100,000
28.	Sub-total.				8,851,810
29.	Engineering, 5% of Item 28.				442,600
30.	Contingencies.				
a.	5% for Hydraulic and Electrical Machinery (5% of $4,360,000)				218,000
b.	15% for the remainder of Item 28 (15% of $4,491,810).				673,800
	Total for Item 30.				891,800
					10,186,210
31.	Total.			Call it:	10,186,000

*1 It is here assumed that these houses will be moved from "Quoddy Village." It is believed that an allowance of $4,000 per house will cover the salvage credit to "Quoddy Village," the cost of moving and the cost of necessary adjustments for utility services, refitting, etc., at the new location.

Transmission Line and Substation.

This contemplates a substation at Haycock Power Station and a 14 mile transmission line from the Tidal Power Substation to the Haycock Substation. The transmission line is a triple circuit, 66,000 volt line, the combined capacity of two circuits being equal to the maximum pumpage load. (± 86,000 kv-a. at 80% P.F.).

Item No.	Item	Unit	Quantity	Unit Cost $	Amount $
1.	Haycock Substation. (on Power House Superstructure)				
a.	Structural Elements.	job.	-	L.S.	38,000
b.	Equipment. (includes main power transformers).	"	-	"	400,000
	Total for Item 1.				438,000
2.	Transmission Line. (14 miles, triple circuit).				
a.	Towers and Fixtures.	job.	-	L.S.	224,000
b.	Conductors and Insulators.	"	-	"	126,000
c.	Roads and Trails along line.	"	-	"	10,000
	Total for Item 2.				360,000
3.	Communication System.	job.	-	L.S.	28,000
4.	Sub-total.				826,000
5.	Engineering, 5% of Item 4.				41,300
6.	Contingencies.				
a.	5% of Electrical Machinery (5% of $400,000)				20,000
b.	15% of remainder of Item 4. (15% of $426,000)				63,900
	Total for Item 6.				83,900
					951,200
7.	Total.		Call it:		951,000

Summary, by Main Project Features, of Cost of Division III.

Item No.	Item	Amount $
1.	Reservoir Dams.	4,471,000
2.	Power and Pumping Station.	10,186,000
3.	Transmission Line and Substation.	951,000
4.	Sub-total.	15,608,000
5.	Rights of Way (Land acquisition).	
a.	For Reservoir, Dams and Power and Pumping Station *1	350,000
b.	For Transmission Line - a R. of W. 400' wide. *2	50,000
	Total for Item 5.	400,000
6.	Total for Division III, exclusive of "General Overhead", "Interest during Construction", and "Quoddy Village", which items will be included in the "Summary for Entire Project."	16,008,000

*1 Contemplates the purchase of 10,000 acres of land at an average price of $35.00 per acre.

*2 Contemplates utilizing Eastport and Lubec Dams and the purchase of approximately 625 acres of land at an average price of $80.00 per acre.

Appendix E.

Summary Estimate, by Divisions, of the Entire Project.

Item No.	Item	Amount $
1.	Division I, which includes Navigation Lock, Filling Gates and the Eastport, Dudley Island and Lubec Dams. (See Appendix B).	22,385,000
2.	Division II, which includes Pleasant Point and Carlow Island Dams, the complete Power House Station with headrace and tailrace channels, earth dam at north end of power house, and all necessary revisions of railway, highway and other utilities. (See Appendix C.)	24,257,000
3.	Division III, which covers the complete Haycock Pump Storage development including transmission line, power and pumping station, dams, highway revisions, etc. (See Appendix D.)	16,008,000
4.	Housing (Quoddy Village and Field Labor Camps.)(Net cost) (See Appendix A.)	1,650,000
5.	Sub-total No. 1.	64,300,000
6.	General Overhead - 6% of Item 5. (See Appendix A).	3,858,000
7.	Sub-total No. 2. *1	68,158,000
8.	Interest during Construction -5¼% of Item 7. (See Appendix A.)	3,578,000
		71,736,000
9.	Grand Total Call it	71,700,000

*1 Attention is called to the fact that the item of "Interest during Construction"(Item 8 above) was not included in either the Army or the Cooper estimates and Item 7, therefore, is the figure which is comparable to the totals of those estimates.

Plates.

PLATE No. I

GENERAL MAP

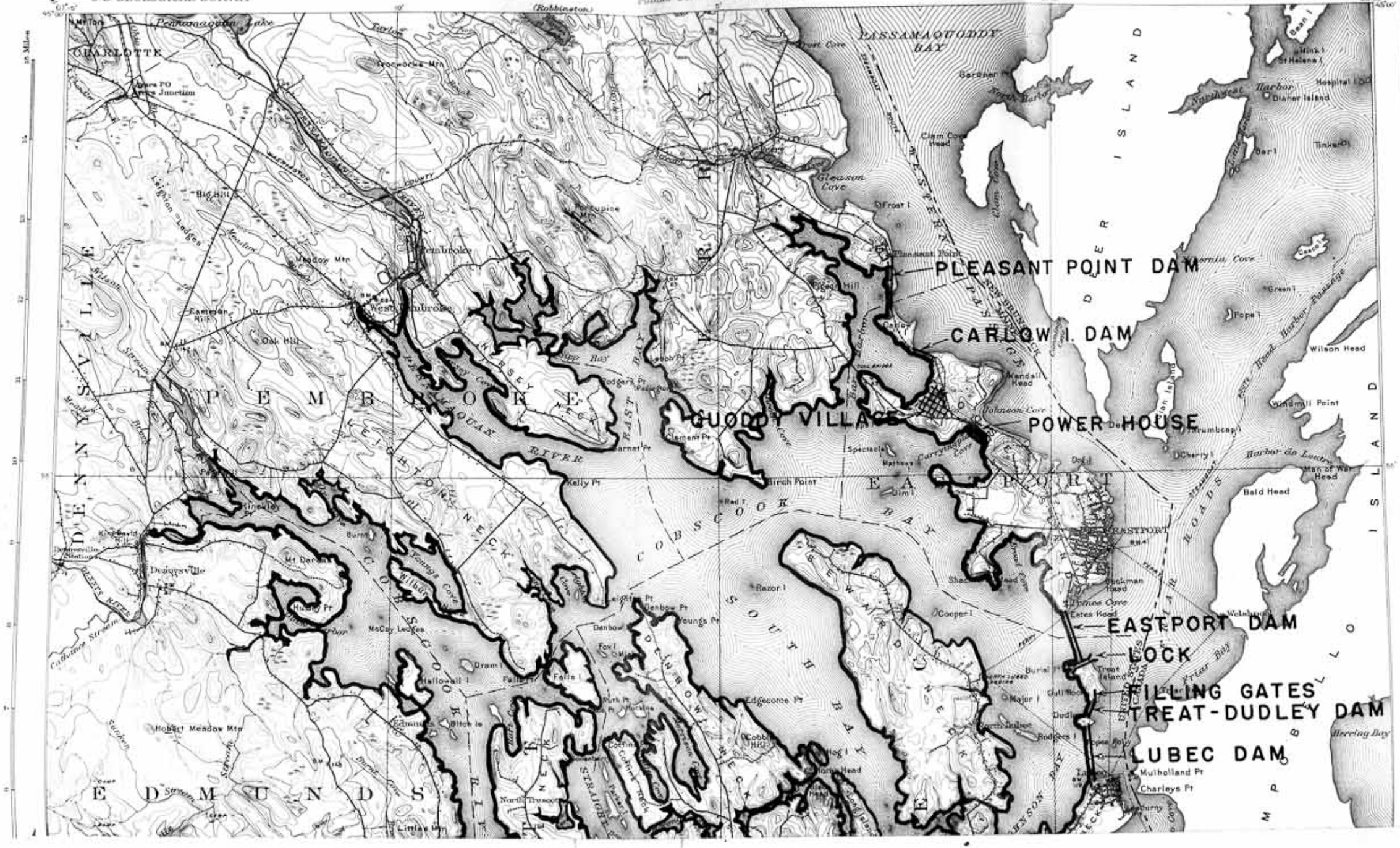
filmed in sections

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

STATE OF MAINE
REPRESENTED BY THE
PUBLIC UTILITIES COMMISSION

MAINE
EASTPORT QUADRANGLE

PLATE No. I



EASTPORT DAM

LOCK

FILLING GATES

TREAT-DUDLEY DAM

LUBEC DAM

DAM No. 6

DAM No.7

DAM No 8

POWER HOUSE SITE "F"

DAM No. 5

DAM No. 4

DAM No. 9

DAM No. 3

DAM No. 1-F-2

DAM No. 10

DAM No. 14

DAM No. 13

DAM No. 12

E D M U N D S

W H I T I N G

T R E S C O T T

COBSCOOK BAY

PASSAMAQUODDY BAY

CAMPOBELLO I.

GRAND MANAN CHANNEL

SCALE OF MILES

Contour interval 20 feet – Datum is mean sea level

PASSAMAQUODDY TIDAL POWER PROJECT

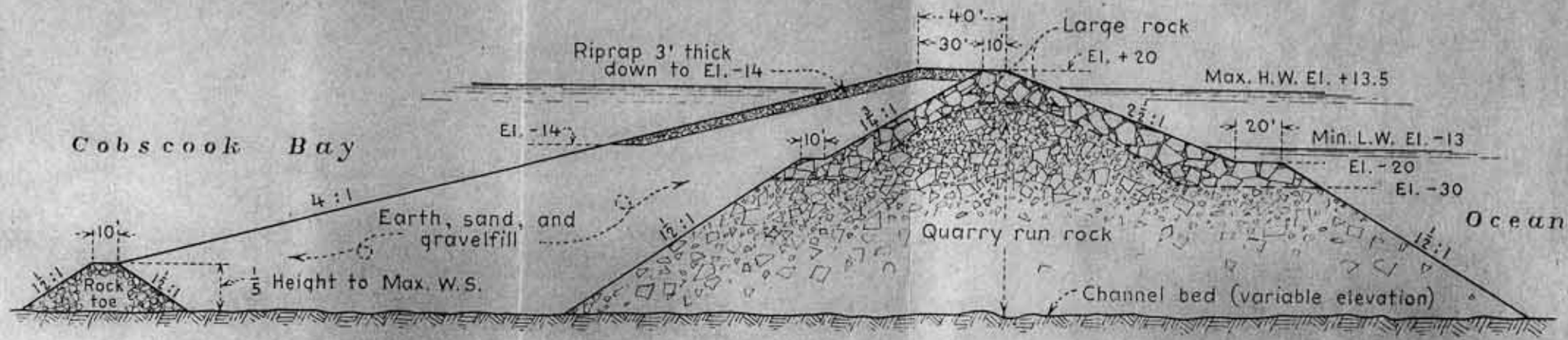
GENERAL MAP

LOCATIONS OF ALL MAIN PROJECT FEATURES

ACCOMPANYING BOARD OF ENGINEERS REPORT ON COST ESTIMATES ON PROJECT

MAY 1936

PLATE No II



0 50 100
Scale of feet
ELEVATION DATUM – MEAN SEA LEVEL

NOTES

(1) Add 10% for waste and drift for both rockfill and earthfill sections of dam.

(2) Add 60% to rock quantities to allow for settlement into plastic clay foundation.

(3) Add nothing for settlement of earth section of dam because of mud wave to be compressed.

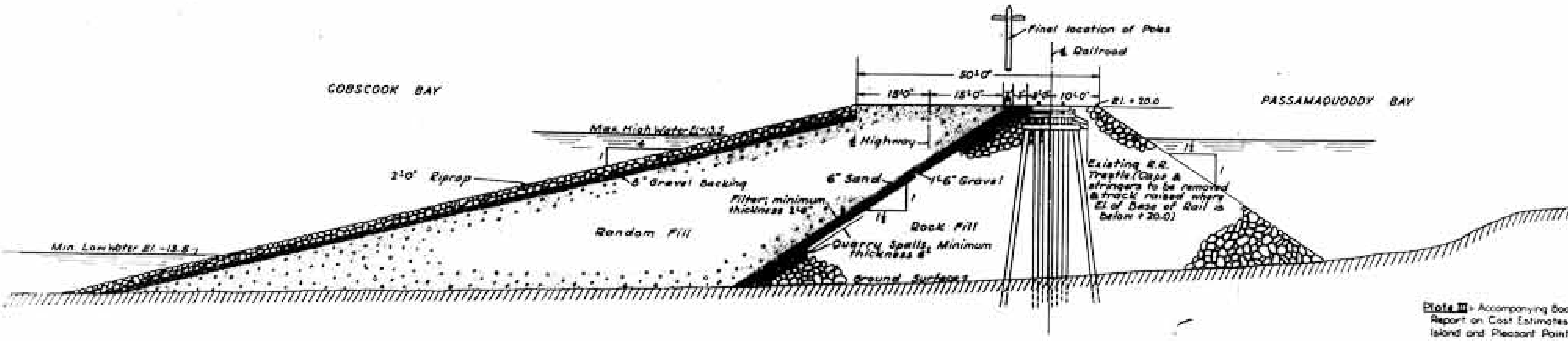
(4) The section here shown is for estimating purposes only.

PASSAMAQUODDY TIDAL POWER PROJECT

TYPICAL SECTION OF EASTPORT, DUDLEY ISLAND, AND LUBEC DAMS

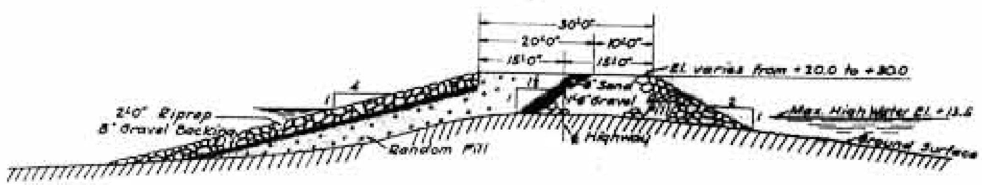
ACCOMPANYING BOARD OF ENGINEERS REPORT ON COST ESTIMATES OF PROJECT

MAY 1936



TYPICAL SECTION OF DAMS

Plate III - Accompanying Board of Engineers Report on Cost Estimates of Project. The Carlow Island and Pleasant Point Dams are now under construction and, therefore, the Board's cost estimates for these dams are based upon the U.S. Eng'r. Dep't. Plan, as here shown, without modification.
May, 1936



TYPICAL SECTION OF PLEASANT POINT DAM
FROM STA. 32 + 38 TO STA. 42+32.25

ELEVATIONS REFER TO MEAN SEA LEVEL

NO.	CHARACTER	DATE	BY
1	Change in slope and stationing Sta 32-38 to end		

REVISIONS

PASSAMAQUODDY TIDAL POWER DEVELOPMENT
CARLOW ISLAND AND PLEASANT POINT DAMS
TYPICAL SECTIONS

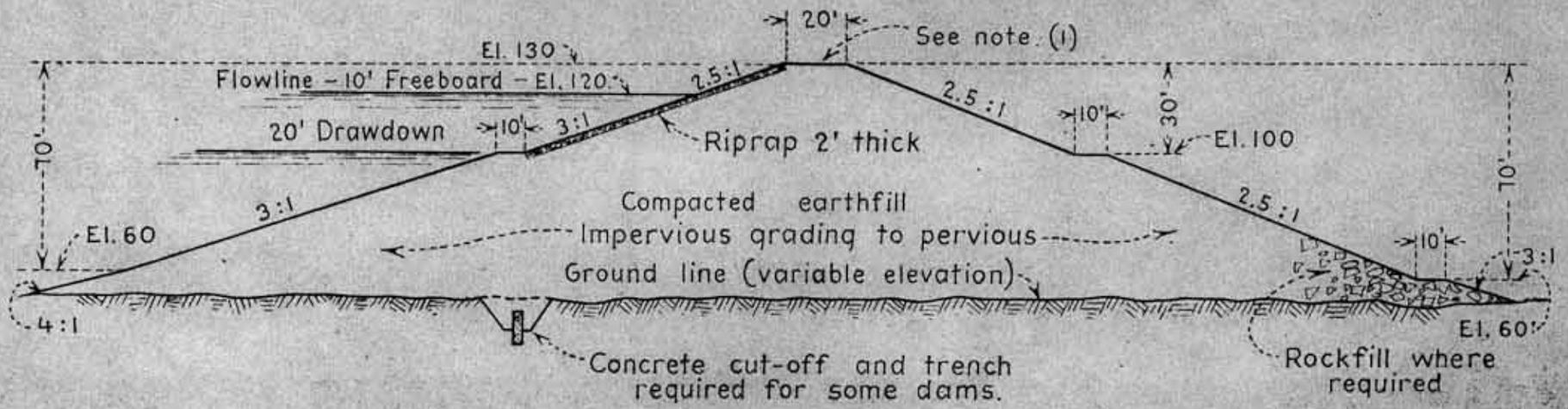
SHEET 3 OF 6 SHEETS — SCALE 1"=10 FT.

U. S. ENGINEER OFFICE, EASTPORT, MAINE — JANUARY 1936

SUBMITTED: [signature] — APPROVAL RECOMMENDED: [signature] — APPROVED: [signature]

[signature] CHIEF, DIVISION II

FILE NO.
DRAWING NUMBER
B-2-267



NOTES

(1) The above section to be used for quantity estimates on all Haycock Reservoir Dams, excepting dam No.4, No.6, and No.7 for which top widths are to be 30' to provide for highways.

(2) For dams No.3 and F, add 20% to provide for questionable foundation conditions.

(3) Cut-off trench and wall estimated only for dams over 30' high.

(4) The section here shown is for estimating purposes only.

0 50 100

Scale of feet

ELEVATION DATUM – MEAN SEA LEVEL

PASSAMAQUODDY TIDAL POWER PROJECT

TYPICAL SECTION OF HAYCOCK RESERVOIR DAMS

ACCOMPANYING BOARD OF ENGINEERS REPORT
ON COST ESTIMATES OF PROJECT

MAY 1936

PLATE No. IX

PSF
B+176

THE WHITE HOUSE
WASHINGTON

Hyde Park, N. Y.,
September 26, 1936.

MEMORANDUM FOR

COLONEL WATSON

Will you find out about the enclosed without bringing in Jimmy's name, and will you return this directly to me and not through the office?

M. A. Le Hand

M. A. Le Hand
PRIVATE SECRETARY

(Enclosure)

P. F.
Passamaquoddy
File P.W.A.
(2)

October 5, 1936.

MEMORANDUM:

Claim No. 051 75 75 - (1) for final payment under War Department contract No. ER 284-ENG-284. This claim is for final payment of $10,000 to Dexter P. Cooper re Quoddy. Claim held up by the Comptroller General.

1. What is status of this claim, as it has already been approved by the Chief of Engineers and the local Engineer office?

2. Has a commission been appointed to look into the whole Quoddy situation?

October 6, 1936.

MEMORANDUM:

1. This claim is under the terms of the contract payable in full ($50,000.00 has already been paid, and $10,000.00 is still due) under three different conditions:

a. That the work shall have been completed, which is not the case.

b. That the work shall have been abandoned.

c. That the Dexter P. Cooper concern turn in all of the outstanding stock, which it is understood was taken by certain Power companies as collateral when they made their original loans to Mr. Cooper.

The recommendation for final payment of the $10,000.00 was sent to the Comptroller General on August 12, 1936 by the office of the Chief of Engineers. Nothing has been heard from the Comptroller, who can only make the final decision on the basis of a, b and c above. He cannot make it under a, as the work was not completed. He cannot make it under c because the stock has not been turned in and probably cannot be obtained for that purpose. He must make the decision under b, and up to date nothing has been heard from him.

2. No commission has been appointed to look into the whole situation. This appointment would be made by the President, who spoke of it at one time, but when legislation failed, it possibly passed out of his mind.

PSF File Personnel PWA

October 26, 1938

RESUME OF LISTS FOR THE PRESIDENT

Available (after all announced allotments)		$22,765,744
Recommended for rescission (Book 398 - net total)		22,965,634
Recommended for rescission (Book 400 - net total)		91
		$45,731,469

Allotments Recommended

Reinstatements (5 projects - Book 345)	$ 423,296	
Chattanooga (Book 401)	3,279,000	
This and Memphis were referred by the President to T.V.A. and the Federal Power Commission. See memo of Power Division in Book.		
Tri-County, Nebraska (Book 403 - net increase)	2,500,000	
This involves reduction in Loup Project of $3,390,000 on Book 402. See memo of Power Division in Books 402 and 403. This also raises whole Nebr. Question and other available Nebr. Projects appear on Book 350, 53 Projects for $1,829,386.		
Projects in Under Quota States (Book 347)	29,415,259	
Hurricane Area Projects (Book 351)	8,863,897	
	$44,481,452	
Balance October 26, 1938	1,250,017	
		$45,731,469
Recommended for Rescission (Book 404)	2,281,654	
Net Balance Available if recommendations above are approved	3,531,671	

PWPF

THE ADVISORY COMMISSION TO THE COUNCIL OF NATIONAL DEFENSE

FEDERAL RESERVE BUILDING

WASHINGTON, D. C.

File PSF Public Works Projects File

PSF PWA

From Sidney Hillman

The New REPUBLIC
40 East 49th Street
New York, N.Y.

November 6, 1940

Dear Lowell:

I know that you are bombarded by authors who think they have done something important that ought to be called to the President's attention. Well, without any apology, I now put myself on that list. I enclose proof of an article from the next issue of The New Republic entitled "Preparedness: The Lesson of Germany" which has what seems to me some quite startling information that the President ought to know about. If you agree, won't you bring it to his attention, in some way or another?

Faithfully,

R Buell

Mr. Lowell Mellett
The White House
Washington, D.C.

Missy -
Bruce Bliven thinks the President may have occasion of reading matter. However, this is interesting.
LLM.

BB:R

Preparedness: the Lesson of Germany

I HAVE BEEN IN Washington looking at the progress of our national-defense effort, and I am deeply disturbed about it. A great deal is being done; a lot of people are working very hard, some of them probably harder than they should for their own sake or the sake of what they are doing. With some exceptions, I am not questioning the activities within the framework of the given program. What I am questioning is the size and character of the program itself.

Let me begin with a kindergarten statement. Either we are in danger from Hitler or we are not. If we are not, then practically all the money that is being spent and everything else that is being done, including the draft, are a wicked waste. So far as I can see, hardly anybody in the United States still holds the view that the German threat to us is unreal, just something that was whipped up by President Roosevelt for campaign purposes.

Next point: If Hitler is a real menace, we can either give in to him or resist him. While there are some individuals who apparently want to give in, their number is so small that we need not even bother to discuss them.

Well, then: If we intend to resist Hitler, we are wasting time and money and committing slow suicide if we try to meet him with less defense than is necessary to have a reasonable chance (which is to say, a practical certainty) of victory. Question: How much defense do we need? We must not forget that adequate strength is the best possible guarantee that we shall have no war. Hitler has never yet picked on any nation which looked as though it might win.

I don't blame you for being impatient with me at this moment, for complaining that I have only stated the obvious. Obvious it is, yet enormous numbers of people don't seem to see it. They are still talking and thinking as did the British and the French before May tenth of this year. In other words, they feel that we should have some defense, but not enough to interfere with business-as-usual, not enough to upset anybody's life, not enough to make any permanent impress on our habits of thought. If that amount of defense turned out to be too little, they would be sorry, just as a lot of people in France today are sorry. By then, it would be too late, just as it is today in Paris.

We don't want to rush out and provide ten times as much defense as is necessary, any more than we want to provide half as much. What do we in fact require? Our problem is certainly different from that of France or England. Despite the changes in modern warfare, our distance from Europe is still an important factor. Even the military experts disagree among themselves, and are uncertain as to just how big our defensive force should be, and of what sort. Laymen like myself are still farther from being capable of judging.

But there is a rough benchmark of a sort that we can use. For several years before the beginning of the war, Germany spent at least 30 percent of her total national income (not her government income) on war purposes, and perhaps more. The size of the figure depends upon just what items you include as coming under "national defense." During the same period, Great Britain spent not more than 12 percent of her national income, perhaps as little as 8 or 9 percent. France spent only slightly more than Britain.

If we were to spend on the German scale, we should at present be putting into our armament program close to twenty-five billion dollars annually. Are we getting anywhere near that?

This year's Congress appropriated eight and three-quarter billions for the army, three and a half for the navy and three-quarters of a billion for miscellaneous purposes, in all just over thirteen billions. To this must be added a previous appropriation of four and a half billions for a two-ocean navy, making a total of about seventeen and a half billions. But this of course is not to be expended within one year. Most of the contracts will take three, four or five years. If we assume that they take five years, they would amount to 5 percent of our national income; four years, 6.25 percent; three years, 8.3 percent. Actually, in the month of August, we were spending at the rate which for the year would represent 3.4 percent of our national income. By December we hope to raise this to 6.8 percent and by next June to 10.2 percent.

I am in a position to reveal a most extraordinary piece of news which has a direct bearing on the question of defense and our national economy. I am able to report that the general impression about what has happened in Germany since 1933 is quite false. The commonly accepted notion is that Hitler has built up his vast machine by laying the whip on the backs of the German people, by starving them and otherwise reducing their standard of life to the absolute breaking point. I am not for an instant condoning Hitler. His treatment of his political enemies and of the Jewish community is the blackest page of modern history. His suppression of all civil liberties has turned back the clock of civilization for centuries. But it is not true that the armament program which Hitler himself boasted has cost ninety billion marks was achieved by lowering the German standard of life. On the contrary, the actual real income of the workers of Germany is probably higher than it was in 1933 when Hitler took over, even allowing for larger numbers and price increases. Roughly, the number in-

creased from 1932 to 1938 by 60 percent, while their income increased about 100 percent. To be sure, the 1932 standard was a low one. There was grim poverty in Germany and there still is. Many foodstuffs were scarce, and some of them are still scarce, or rationed, or completely lacking. Nevertheless, the general picture is not one of a steady decline toward the abyss.

This observation is based upon study of the German government's own statistics as to wages, hours, consumption of foodstuffs, and so on. It is possible that these statistics are falsified, but it is not likely that they are grossly garbled. All government statistics nowadays are under suspicion, but the experts who have studied Germany's figures most carefully believe that they are more or less correct. When a situation is not to the liking of Hitler's officials, they do not put out misleading figures; they suppress them altogether.

I do not mean by my statement above that the condition of all classes in Germany has remained static. The poorest workers (not including the Jews, whose condition is an indescribable horror) are better off proportionately than others, as regards the sheer physical necessities of life. (What you may think about a muzzled and blindered totalitarian population is of course another matter.)

How has this seeming miracle been accomplished? By a staggeringly large increase in the national income. To state it very simply, Hitler put all the idle men and machines to work, kept them at work, made them work harder than ever before.

The story is told in the statistics of total national income, expressed here in billions of marks:

1928	75.3
1932	45.1
1933	46.5
1935	58.6
1937	72.5
1938	79.7

The gains in national income here recorded add up to a very sizable amount. If we take 1932 as the base level, the added income each year over 1932, down to 1938, is roughly as follows, in billions of marks:

1932 to 1933	1.4
1932 to 1934	7.5
1932 to 1935	13.5
1932 to 1936	19.5
1932 to 1937	27.4
1932 to 1938	34.6

This total of 103.9 billions easily permits Hitler's boasted expenditure on armament of ninety billion marks and still leaves a handsome surplus for other purposes. As a matter of fact, Hitler's statement also included 1939, by which time the gain in national income may easily have been very much larger still.

During this rise, the workers did not quite obtain their proportionate share of the total. A study recently made by Dr. Otto Nathan of New York University, to which I am indebted for much of this material, indicates that the workers' share declined by about three percent and the share of the entrepreneur increased proportionately. Since Hitler's whole propaganda says that National Socialism is a wonderful thing for the laboring class, it is unlikely that he would permit statistics to be published supporting this conclusion if it were not correct.

The astonishing, never told story of what happened in Germany goes something like this:

When Hitler came to power, his first act was to increase employment by made work. He did not suffer the handicap of conservative public opinion as the United States did in facing a similar problem at about the same time; he was not forced to find means of employment that failed to compete with private enterprise. On the contrary, he could use his workers at whatever he thought best, and what he thought best was preparation for war. This went off into numerous activities: strategic military roads, new airports, shipyards and drydocks; but wherever it went, Hitler followed. In a few cases, he instituted government-owned and operated activities, but on the whole, he gave war orders to existing private firms, and these increased their staffs and sopped up unemployment thereby. When these firms did not have sufficient funds for extension of plant, the government loaned them the money in a roundabout way somewhat as the RFC is doing for American firms with war orders.

People not only went back to work, but everyone worked harder than before. (Some were in labor camps as virtual prisoners.) Under Hitler's incessant drive, hours were lengthened. In most cases they were slightly longer than those of 1929, and very much beyond those of 1932. Only rarely were they so increased that productivity was impaired. Elderly mechanics were brought back to their machines; handicapped people were given tasks fitted to their abilities. The percentage of women workers to men, which at first declined a little, soon increased. Hitler had begun his regime with a burst of magniloquent propaganda that woman's place is in the kitchen, when she isn't in the hospital delivery room. He did this to try to make jobs for unemployed men; previous German governments have done the same thing. As unemployment among the men dropped, Hitler changed his tune. The distinct inferiority of the female continued to be part of the Nazi philosophy, but every woman able to work was sucked out of the home and into the factory.

To return to the chronological account: having ended unemployment and indeed created a situation where there was an actual shortage of workers, Hitler proceeded to increase the total plant capacity of Germany by a huge amount. Naturally, war industry came

first, not only in orders given and money loaned but in priorities for raw materials. Existing plant was modernized and expanded. Machines were worked as many hours in the day as was possible. (In the increased productivity, technological advance played a comparatively small part. There had been an enormous improvement between 1929 and 1932, during the blackest years of the depression, but little thereafter.)

For his own special purposes, Hitler instituted a genuine planned economy which, while it certainly should not be imitated as a whole, was efficient for those special purposes. All capital investment throughout Germany was under government supervision and was forbidden if it ran counter to the general purposes of the regime. Waste of every kind was fought vigorously. Hitler was spending the whole force and energy of his nation on preparation for blitzkrieg.

Would the German economy collapse if the war effort were to end either with a defeat or with a victory? It might, but this is by no means certain. While the element of private profit still continues and the entrepreneur has been protected and maintained in his function, though on a somewhat reduced scale, Germany has retained enough power over the economic life of the country so that she could make a quick shift from one kind of activity to another. If the war were to end tomorrow, leaving Hitler and his system still in power, there is no reason why the same energies that went into building battleships and tanks should not go into building houses and roads and parks. The morale of a people can without doubt be raised to a somewhat higher level by confronting them with the real or imaginary danger of external attack; but any nation at any time has high enough morale to prefer prosperity to unemployment and starvation. Quite aside from the inhuman barbarism of Hitler's regime, his policy of putting everyone to work, whether private business was prepared to carry the load or not, is a sound one that might well be copied everywhere. After all, there is a certain amount of cruelty involved in the alternative system of keeping people unemployed over long periods of time either with no help or with limited public or private charity.

The lesson of all this for the American armament program should be plain enough for all. As a cold matter of fact, we are now doing in this country many of the things on the economic and industrial front that Hitler did in 1933, 1934 and thereafter. I only hope that we can learn our lesson to the full. We must realize that when Goering talked about "guns or butter" he was lying as usual. In Germany, certain imported products were sacrificed in order to bring in needed raw materials for war; but in the broad way in which Goering's phrase is usually applied, it is just nonsense. You don't need to choose between guns and butter; in fact, the surest way to get the best guns and enough of them is to furnish plenty of butter at the same time. Here are some striking statistics showing Germany's consumption of certain products per person per year, in kilograms:

	1932	*1938*
Butter	7.5	8.8
Lard	8.5	8.4
Margarine	11.3	8.7

Off-hand, it would seem that the butter-eating people did better and the margarine-eating people did worse, unless you assume that some people shifted from margarine to butter. However, these figures must all be read with great caution; for one thing, they include foodstuffs stored as well as those consumed.

The American national income is at present about seventy billion dollars. Under the impetus of war orders, plus whatever natural recovery may be taking place from other causes, it will probably go up to eighty billions within the next year. There is no reason on earth why it should not rise to one hundred billions in the near future. If we will plan our economic life as intelligently in the interest of democracy as Hitler planned Germany's in the interest of Nazism and war, we can have our armaments—all we need of them. We can have a genuine improvement of our economy, the scrapping of obsolete and obsolescent machinery, an expansion of plant to fill all reasonable needs, a standard of living for the whole country that is now available only to the favored few. BRUCE BLIVEN

Flight of the Heart

Heart, my heart, what will you do?
There are five lame dogs and one deaf-mute
All of them with demands on you.

I will build myself a copper tower
With four ways out and no way in
But mine the glory, mine the power.

And what if the tower should shake and fall
With three sharp taps and one big bang?
What would you do with yourself at all?

I would go in the cellar and drink the dark
With two quick sips and one long pull,
Drunk as a lord and gay as a lark.

But what when the cellar roof caves in
With one blue flash and nine old bones?
How, my heart, will you save your skin?

I will go back where I belong
With one foot first and both eyes blind;
I will go back where I belong
In the fore-being of mankind.

LOUIS MACNEICE

MEMO FOR MARY

Will you make a new folder of things the President wants to take up with the new Administrator of Public Works when he is appointed?

G.

PWA

PSF

[1940]

JOHN JASTER, JR. - 1339 LINCOLN ROAD - COLUMBUS, OHIO

Graduated in 1908 from Case School of Applied Science in Civil Engineering. While at Case, was President of the Senior class; a member of the Skull and Bones, and Owl and Key societies, and the Zeta Psi Fraternity. Attended for one year (at night) the Cleveland Law School of Baldwin Wallace Univ.

1908-1909
Engineer for J. C. Dunn, General Contractor, on sewer construction in Cleveland, Ohio, and on concrete bridge construction near Spartanburg, South Carolina. Experience gained in job office management, cost accounting, and construction engineering and supervision.

1909-1912
Engineer with the George A. Rutherford Company, General Contractors. Duties included the design, estimating and supervision of building construction projects.

1912-1932
Member of the firm of Uhl-Jaster Company, General Contractors, engaged in the design and construction of commercial, industrial and residential buildings. Had broad experience in design, estimating, cost accounting, purchasing, organization, supervision and administration in connection with all kinds of building construction and reconstruction.

1932-1934
Division Engineer of the Ohio Department of Highways, with headquarters at Cleveland, Ohio. Duties were chiefly administrative, but included a close supervision of the design, construction and maintenance of the highways and structures in my division.

1934-1938
Director of Highways of Ohio. The Highway Department included the Bureau of Motor Vehicles and the State Highway Patrol. Duties were chiefly administrative. Valuable training received in contacts with other departments and units of government, and with public utilities. The Highway Department is, of course, mainly concerned with the design, construction and maintenance of highways and highway structures, but included many related departments which gave one much experience. A few such departments are: purchasing, testing; landscaping; safety; statistical; auditing; right of way, and sales. One also, received a particularly good training in the award and supervision of construction contracts.

I have been a member of and actively interested in many engineering and construction organizations, which have contributed a great deal to my qualifications. Some of these organizations and my connections with them have been as follows:

President of the General Contractors Association, Cleveland, Ohio. I served on many committees of this organization, dealing with important construction problems, such as safety, labor relations, standards, industrial compensation and uniform contracts.

President of the Carpenter Contractors Association of Cleveland, Ohio, and for many years on the arbitration committee and the committee supervising the carpenter apprentice trade school.

Member of the Mason Contractors Association of Cleveland, Ohio, and for many years on the arbitration committee.
Member of the Mason Contractors of the United States and Canada.
Member of the Building Trades Employers Association of Cleveland, Ohio.
Director of the Builders Exchange of Cleveland, Ohio.
Served on the Board of Awards, which gave medals for the best buildings of various types erected each year in Cleveland, and on the committee for the revision of the Cleveland Plumbing Code.
Member of the Associated General Contractors of America.
Member of the American Association of State Highway Officials, and served on the administrative committee.
Member of the American Road Builders Association.
Member of the Engineers Club of Columbus, Ohio.
Member of the Ohio Society of Professional Engineers, and served on the Board of Trustees.
Member of the National Society of Professional Engineers.

Registered under the laws of Ohio as a professional engineer in civil engineering and surveying.

32nd degree Mason and member of Aladdin Temple.

MEMBER CLEVE REAL ESTATE BOARD
LIFE MEMBER ASSOC. CHARITIES &
MEMBER WAYFARERS LODGE COMM.
UNIV. CLUB
ADV. CLUB